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ABSTRACTS OF TUBERCULOSIS

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Tuberculosis Mortality.—Charts are shown with curves of the death rates from pulmonary tuberculosis per 1,000 living at various ages in certain countries. It is noted that: 1. A pronounced fall in mortality from pulmonary tuberculosis has taken place during the past forty years for both sexes in England and Wales, Scotland, Netherlands, Amsterdam, and Switzerland. 2. Females in each instance display a greater tendency than males to succumb in early adult life, and this tendency has become more pronounced in recent years. 3. Males in each instance display a greater tendency than females to succumb in middle life. This tendency has been more pronounced in recent years, particularly where industrialism is most in vogue. Constructed from *The Causes of the Recent Decline of Tuberculosis Mortality* (*Preliminary Report*), Y. M. Biraud, Health Committee, League of Nations, Geneva, c. 224, m. 80, 1925, iii.—*Tuberculosis Statistics, Tubercle, January, 1926, vii, 178.*—(*J. C. D.*)

Pulmonary Tuberculosis among Jews.—Of 225 cases examined, 138 (61.3 per cent) were men and 87 (38.7 per cent) women, and of these 38.7 per cent died in the sanatorium, while 45.8 per cent were discharged as improved. The disease in the women showed a steep curve of onset in the first half of the third and the second half of the fourth decades. The average sanatorium treatment was 4.3 years for both sexes, the average period of death, excluding those occurring during the first year of life, was 6½ years. There was noted a turn for the worse among the Jews during the war period. In spite of this there were individual cases which ran a favorable course.—*Über das Verhalten der Lungentuberkulose bei den Juden, I. Werner, Ztschr. f. Tuberk., 1925, xliii, 130.*—(*H. J. C.*)

Tuberculosis in Prisons of Prussia.—In Prussia there is lack of consideration and protection against tuberculosis in penal institutions. The rations are in no way adequate to its prevention, and when the disease develops it usually takes on a very active pulmonary form.—*Tuberkulose und Gefängniswesen, H. Thiele, Ztschr. f. Tuberk., 1924, xl, 264.*—(*H. J. C.*)

Present Status of Tuberculosis in Germany.—In the German communities of 15,000 or more inhabitants, the morbidity figures for 1921 were 0.157; 1922, 0.166; and 1923, 0.178, an increase in incidence. The mortality is divided equally between the various age periods; most of the cases die within the first four months of their disease. During the months of August to October there is a diminution. A similar condition obtains in the 46 cities of Germany with 100,000 or more inhabitants; morbidity for 1921 being 0.149; 1922, 0.159; and 1923, 0.171. Mortality in the cities is higher than in the country as a whole. In the whole country the figures, as regards sex, are about equal, 0.136. Tuberculosis in children and adults has suffered an increase during the past few years, especially among small children in Berlin and Heidelberg. The causes of the renewed increase of tuberculosis are to be sought for in the general social conditions.—*Der heutige Stand der Tuberkulose in Deutschland, B. Möllers, Ztschr. f. Hyg., 1924, ciii, 259.*—(*H. J. C.*)

Recent Increase of Tuberculosis Mortality in Germany.—The tuberculosis mortality in Germany has been increasing recently. In the cities of over 15,000 inhabitants it was 17.8 per 10,000; in the spring of 1924 there was a decrease. In the Karlsruhe Hospital there was an increase of 25 per cent in 1923 over the previous year.

The cause is to be found in the business depression.—*Die erneute Zunahme der Tuberkulose in Deutschland, O. Geissler, Beitr. z. Klin. d. Tuberk., 1924, lix, 475.*—(*H. J. C.*)

Tuberculosis among War Veterans.—Experience with tuberculous soldiers reveals no new or unusual aspects of the disease and shows that the usual constitutional and environmental factors played their part as they do in civil life.—*Die Phthiseogenese der Kriegsteilnehmer, P. Gerber, Wien. klin. Wchnschr., May 1, 1924, xxxvii, 431.*—(*H. S. W.*)

Tuberculosis Mortality in Wiesbaden.—The statistics are given for the vicinity of Wiesbaden for the years 1909 to 1920. From 1909 to 1910 tuberculosis mortality increased, and then gradually dropped until 1914. During the war it reached a peak of 25.48 per 10,000 inhabitants. Following the war there was a definite decline, especially in 1920. The high mortality in Westerwald is attributed to the inhalation of dust in the stone industries, besides unfavorable climatic conditions, and the poverty and poor nutrition of the inhabitants.—*Über Tuberkulosesterblichkeit im Regierungsbezirke Wiesbaden, T. Weygandt, Beitr. z. Klin. d. Tuberk., 1924, lx, 149.*—(*H. J. C.*)

Tuberculosis Mortality in Lithuania.—Reliable statistics of tuberculosis mortality in Lithuania do not exist. The mortality figures in 1924 were obtained for the state of Kowno, and are of only limited value in determining the mortality in Lithuania. The figures available indicate approximately a mortality of 300 per 100,000 inhabitants. Three-fifths are males. The highest mortality occurs between the ages of one and five years, the majority of cases of this age being tuberculous meningitis.—*Zur Tuberkulosesterblichkeit in Litauen, L. Kogan, Ztschr. f. Tuberk., 1925, xliii, 216.*—(*H. J. C.*)

Antituberculosis Measures.—In the fight against tuberculosis, efforts of most of the organizations have been unorganized, sporadic and unrelated to those of other similar associations, and much clearing of the ground is necessary. One of the grievous situations is that of the failure of recognition of the disease by the practising physician in its early stages. These patients not only do well under treatment but the course of treatment is not so long and therefore is of lessened cost to the state. Another need is that of an adequate social service organization as a part of the public health service, its function being to take care of admissions to hospitals, keeping of records, following cases, placing them in sanatoria, etc. There should be a country-wide commission, made up of representatives of all antituberculosis organizations, which should bring some order into existing conditions.—*Für die Vereinheitlichung des Tuberkuloseabwehrdienstes und eine zweckentsprechende Regelung des Verkehrs zwischen Arzt, Spital, Fürsorgestelle usw., E. Weidinger, Wien, klin. Wchnschr., May 1, 1924, xxxvii, 450.*—(*H. S. W.*)

Conquest of Tuberculosis.—The problem of the conquest of tuberculosis can be solved, but thus far the factors at work have been unsuccessful. It is recommended that early diagnosis, widespread ambulant treatment, repeated examination of older children and adults by means of school and institutional physicians, family control, especially in new residents, family sanitation and supervision of all cases, be utilized.—*Ist das Problem der Tuberkulosetilung lösbar? J. Petruschky, Ztschr. f. Tuberk., 1925, xliii, 15.*—(*H. J. C.*)

Antituberculosis Work in Porto Rico.—A health survey of Porto Rico has revealed much poverty and squalor among the poor, as well as bad housing conditions. Nearly all the families sleep with windows tightly shut or in houses without windows, and there is great overcrowding. Among these people there is a great deal of tuberculosis and but little or no hygienic attention to the ill or protection of the relatives. About 2 per cent of the population have tuberculosis, and most of these had not been reported prior to the health survey. Dispensaries with free medicine, visiting nurses, etc., have been organized. Public-health authorities provide for the removal of certain contacts, furnish food for destitute families and are trying to educate the people in matters of health and ordinary hygiene. In this the dispensaries play an important part. A preventorium and several new sanatoria are under construction. These will serve chiefly the rural parts of the island and to some extent the cities as well. The mortality from tuberculosis is quite high; in 1923–1924 it was 204.5 per 100,000 inhabitants.—*Organizing the Work against Tuberculosis, J. R. Pastor, Porto Rico Health Rev., July, 1925, i, 19.*—(*H. S. W.*)

Intellectual Weapons in Tuberculosis.—Tuberculosis is not a disease of poverty, but rather of ignorance. The attack with intellectual weapons is the foundation of the entire campaign against

tuberculosis. Memorandum sheets and explanatory papers are convenient, but of little value. The film may, if properly presented, be a valuable educational medium. The most valuable, however, is the spoken word, which must be so appealing that it finds response in the heart of the listener. Above all, the school must be won over for enlightening purposes. Health lectures must be introduced into all schools as a part of the routine.—*Tuberkulose-Bekämpfung mit geistigen Waffen, Sell, Beitr. z. Klin. d. Tuberk., 1924, lix, 395.*—(*H. J. C.*)

Etiological Factors of Tuberculosis.—Tuberculosis is a disease that is greatly influenced by both constitutional or hereditary factors and environment, that is, the mortality rate from this disease is influenced by both "endogenous" and "exogenous disposition." The incidence of tuberculosis of children in tuberculous families is higher in those whose date of birth is nearer the date of death of the parent. This is much more marked where the mother has died than where the father has died. But the economic status of the family is of greater importance, the mortality incidence being considerably greater in the poorer families. It is important to control all tuberculous people before disease in children is manifest. The practising physician must bear the brunt of responsibility in this matter.—*Die tuberkulöse Belastung, E. Hoffstaedt, Klin. Wchnschr., October 14, 1924, iii, 1919.*—(*H. S. W.*)

Contagiousness of Tuberculosis Patients.—The term "open" tuberculosis should be applied to those persons with areas of disease that have ulcerated into bronchi, with the result that tubercle bacilli are constantly or nearly constantly present in the sputum. As a result of sudden rupture of a caseous or purulent area into a bronchus, a case may be transformed from "closed" to "open" tuberculosis. The term "facultative open" should be applied to those cases that are clinically tuberculous and in whose sputum no bacilli can be found, for bacilli may appear at any time. In such cases bacilli are often present for a short time and then disappear. "Closed" tuberculosis connotes a tuberculous process in the lungs that is so shut off by scarring from the bronchi that no bacilli reach them. Clinically, the "obligate open" cases are usually sick, and show both signs and symptoms of tuberculosis. The "facultative open" cases practically always show either signs or symptoms or both, while the "closed" types usually would be passed up by physical examination except for signs of old fibrosis. A new classification should be introduced and should have patients grouped as follows: *1:* All cases with bacilli in the sputum, whether with or without physical findings. These should be reported. *2:* All cases with constant physical findings. *3:* All with symptoms with or without physical findings. *4:* All cases of tuberculous laryngitis, irrespective of the presence of bacilli in the sputum.—*Ueber die Abgrenzung der ansteckungsfähigen Lungentuberkulosen gegen die nichtansteckungsfähigen, A. Winkler, Deutsche med. Wchnschr., May 23, 1924, l, 689.*—(*H. S. W.*)

Danger of Tuberculous Infection.—Among the social causes responsible for the spread of tuberculosis must be included the migratory habits of many cases suffering from pulmonary tuberculosis. Many of them temporarily inhabit one or more rooms in our health resorts. They are usually poor, and often have a chronic form of the disease. They try not to consult a doctor in their new locality, and therefore are under no restrictions whatever. The apartments they take at the seaside are very cheap because they are taken during the off season. Scrupulous cleanliness with many landladies is at a discount, and no regard is given to disinfection. When the season begins the tuberculous tenant usually leaves, and a succession of visitors come in. The rooms most certainly will not have been disinfected and probably only imperfectly washed and cleansed. Oftentimes the blankets are infrequently changed and it is quite a common practice to run the sheets through a mangle to give them the appearance of not having been used. It is suggested that the principle of segregation be developed. These patients should be able to obtain apartments suitably furnished, easily cleaned, and dust-free, and the apartments should be under the management of a woman who has had special training for the work.—*The Danger of Tuberculous Infection from Migratory Consumptives, W. B. Tomson, Brit. J. Tuberc., October, 1925, xix, 196.*—(*J. C. D.*)

Origin of Phthisis of Puberty.—Of 35 cases of phthisis of puberty, there were 14 in which the infection developed very slowly, taking at least three years. In only 3 of the 14 cases was there an opportunity for exogenous reinfection determinable.—*Zur Frage der Entstehung der Pubertätsphthise, W. Falk, Beitr. z. Klin. d. Tuberk., 1924, lix, 669.*—(*H. J. C.*)

Infectiousness of Tuberculosis.—It is the duty of each public health official to pay attention to "closed" as well as "open"

tuberculosis. Careful and frequent examination of sputum is not undertaken among practitioners nearly to the extent that it should be. Patients also seek to keep their disease a secret, and this aids in the exposure of many people. The heart of the matter is in hygiene. One must study the patient's surroundings, his children, his occupation, etc.—*Noch ein Wort zur Frage der "ansteckungsfähigen" Tuberkulose, Kayser-Petersen, Deutsche med. Wchnschr., November 28, 1924, l, 1647.*—(*H. S. W.*)

Heredity in Tuberculosis.—In two earlier papers the authors endeavored to show that the notion of latent congenital tuberculous infection by a few bacilli during intrauterine life, as well as the theory of an hereditary susceptibility, are based upon only exceptional facts or upon views which have no sound basis. The old controversy must be settled ultimately by the study of children of tuberculous parents, removed from their tuberculous environment so soon after birth as to eliminate the possibility of infection. Such removal is being practised under the supervision of the authors, and the infants brought up under conditions as favorable as possible, at first in the children's ward of the Laennec Hospital, Paris, and later in the country. They fall into two groups: (1) the large group who survive and will be discussed in a later paper, and (2) the small group who die during the early weeks without demonstrable cause. This paper deals with the question of whether death in the smaller group is due to inherited tuberculosis in any of its manifestations. The authors argue against this hypothesis on the basis of very painstaking autopsies of 15 of these cases of early death taken in order. The skin reaction to tuberculin was performed several times in all the infants which lived, except one. It was always negative, from birth to death. Complement fixation for tuberculosis was done ten times with blood obtained from the umbilical cord or by cupping. It was positive in 6 cases and negative in four. Wassermann reaction was performed with the blood of all mothers and all infants. It was always negative. There were 3 stillbirths and 2 premature infants born during the eighth month who survived 30 and 39 days respectively. The other cases lived from 12 days to 11 months, but for the most part died within 45 days. There were 6 cases of digestive ailments, one of acute bronchopneumonia, 2 of progressive inanition with digestive troubles, and 2 cases of death between the ninth and twelfth month from milk intoxication and a condition which showed only an enlarged thymus gland. At autopsy both gross and microscopic examinations were made of all organs; slides of the organs were stained for tubercle bacilli; and, finally, 10 to 25 guinea pigs were inoculated with tissues from each body examined. In no case was there any evidence of tuberculosis. While these negative findings do not unequivocally dispose of the question of hereditary infection, they, nevertheless, render it extremely improbable from a practical point of view, and an explanation of the deaths must be sought elsewhere. As a matter of fact, these deaths occur in any institution and result essentially from artificial feeding, want of the many little maternal attentions, and life in an institutional group in general. The reduction of this mortality will be brought about by perfecting the facilities for the care of infants—*Différent aspects de l'hérédité tuberculeuse (Troisième mémoire). L'enfant issu de parents tuberculeux séparé avant la contamination: la mortalité. R. Debré and M. Lelong, Ann. d. Méd., October, 1925, xviii, 256.*—(*W. B. S.*)

Heredity in Tuberculosis.—This fourth study of the aspects of heredity in tuberculosis was made in an effort to confirm or disprove the idea that the child born of tuberculous parents is prone to be substandard in size and health, and not well and strong. The authors have had a very unusual opportunity to observe infants born under these conditions through their association with the French society which places them in the country, the so called *Oeuvre du placement familial des tout-petits.* How many of such infants are born prematurely? At the Laennec Hospital only 10 per cent of infants of tuberculous parents were born prematurely, and in such an event the mother was always found to be suffering from advanced progressive disease. What is the weight of such infants at birth? There were 433 cases studied from this point of view. In general these infants were neither debilitated nor below weight at birth? Their weight closely approximated the normal. When much below par their condition was due to lack of necessary food and comforts rather than to tuberculosis. Do these infants show any greater tendency to congenital malformations, as so often stated? From autopsies and from the examination of 300 cases the authors are convinced that congenital malformations are no more frequent than in children of nontuberculous parents. Are the weight and height of these children below or essentially different from the normal? An extensive study of these children at birth and at frequent intervals up to five years shows a slightly lower weight on the average

up to eighteen months, probably on account of artificial feeding. After eighteen months the weight is normal and also the weight-height ratio. Do these children show any special predisposition or lowered resistance to infectious diseases or to rickets? As a matter of fact, they do not become infected in a manner any different from other children, and the course of the disease is not different. Nor do they have rickets more frequently than other children. If protected from birth from tuberculous infection, they do not become tuberculous and the skin reaction remains negative indefinitely. To sum up this and the authors' three other studies: There is no inheritance of infection except very exceptionally; the theories of latent congenital tuberculosis and heredity of soil are founded on impressions for which no basis of fact can be found.—*Différents aspects de l'hérédité tuberculeuse (Quatrième mémoire). L'enfant issue de parents tuberculeux séparé avant la contamination: sa croissance et sa résistance aux maladies, R. Debré and M. Lelong, Ann. d. Méd., November, 1925, xviii, 347.*—(*W. B. S.*)

Inherited Physical and Psychic Characteristics in Tuberculosis.—The present discussion is confined practically to the adult type of tuberculosis. There are undoubtedly marked individual differences in resistance to tuberculosis, apart from the dosage of the infection received. Certain patients may succumb to a relatively small infection, while others withstand widespread lesions. Constitutionally inherited characteristics of body cells undoubtedly play an important part. Pearl has shown that persons suffering from clinical tuberculosis have a much greater amount of tuberculous disease in their blood relations than have the non-tuberculous, the data from 57 families showing a six-fold difference, which seems too great to be explicable purely on the ground of familial contact. Pottenger has long noticed that many tuberculous patients manifest certain psychological traits, and have to struggle not only with their disease but with their own emotional shortcomings. Many tend to shrink from the problems and responsibilities of life and become egocentric. They readily assume an attitude of dependency, become unmindful of others' rights, and show a reversion to childhood traits. How far these traits are the effects of illness is not entirely clear, but there seems in addition to be some fundamental inadequacy. Some believe that the unstable, regressive, shut-in type is particularly affected by tuberculosis, that the emotional traits cause a prodigal misuse of energy and weaken the physique. In any event the psychic side of the tuberculous patient requires as much care and consideration as the physical side, and a very thorough study.—*Some Observations on Inherited Physical and Psychical Characteristics in Tuberculous Patients, F. M. Pottenger, Med. J. & Rec., January 6, 1926, cxxiii, 1.*—(*A. P.*)

Inherited Predisposition of Child to Tuberculosis.—This study was an attempt to correlate susceptibility to tuberculosis with certain inherent traits of the individual, similar to that which, according to Mendelian principles, was found to be the case in the predisposition of certain plants and animals to specific infection. The predisposition to infectious diseases is related more or less to inherited traits. The work of Wright and Lewis on the resistance of certain guinea pigs to tuberculosis, which is of an inheritable and also constitutional nature, is referred to. Among human beings there are also found individual and constitutional differences in the resistance and reaction to tubercle bacilli, which are unassociated with the amount of exposure to and the mode of infection, or the virulence of the infecting agent. Too much stress has been laid on variations of the infecting agent, the tubercle bacillus.—*Die Erbanlagen des Kindes in Bezug auf Tuberkulose, J. Bauer, Beitr. z. Klin. d. Tuberk., 1924, lix, 477.*—(*H. J. C.*)

Anatomical Predisposition to Apical Tuberculosis—Two cases of muscular atrophy and paralysis of the affected part of the chest, one case of abnormal elevation of the shoulder with rigidity of the ribs arising *in utero*, with narrowing of intercostal space and constriction of the apex, and, finally, one case of ankylosis of the left shoulder and atrophy of the entire neighborhood, are reported. All the cases had, in common, an anomaly which is considered a necessary predisposing factor, and capable of explaining the localization and the course of the disease. The anomaly resulted in a limitation of aeration and diminution of the lymph supply, thus predisposing toward a localization of tubercle bacilli.—*Über erworbene Anlag zur Spitzentuberkulose. Kasuistische Beiträge, C. T. Zeitschel, Beitr. z. Klin. d. Tuberk., 1924, lix, 26.*—(*H. J. C.*)

Tuberculous Milk.—Periodic examinations of mixed milk from a herd or herds by inoculation into guinea pigs show that bacilli may be present intermittently in the milk. Special samples from cows with tuberculin reactions or signs of clinical tuberculosis show bacilli more often than samples from the mixed milk of the herd to which the cow in question may belong, but in these

samples bacilli cannot always be demonstrated.—*Tuberculous Milk, E. J. Burndred, Veterinary J., April, 1925, lxxxi, 191.*—(*H. S. W.*)

Dangers of Tuberculous Milk.—The milk of tuberculous cows usually contains large numbers of tubercle bacilli and is decidedly a menace, yet some advocate the ingestion of small numbers of bovine bacilli in milk, on the theory that such a procedure would protect the child against the graver infection that might come from the human bacillus. The actual figures show that the bovine bacillus is very definitely a menace to the community. In children under five years of age bovine bacilli cause disease of the cervical lymph nodes in 85 per cent of cases, of lupus in 66 per cent, of scrofuloderma in 58 per cent, and of bone and joint disease in 30 per cent; while the figures for all ages, for the same groups of cases, are, respectively, 48 per cent, 51 per cent, 38 per cent and 19 per cent. The bovine bacillus is probably just as infectious, intrinsically, for man as is the human bacillus, and a small dose of bovine bacilli, even by the intestinal tract and in milk, may lead to fatal disease in human beings.—*The Danger of Tuberculous Milk, A. S. Griffith, Veterinary J., April, 1925, lxxxi, 167.*—(*H. S. W.*)

Route of Tuberculous Infection.—Even though aerogenic dust infection plays the main rôle in the development of tuberculous infection, contact infection or intestinal infection is not to be minimized. Anatomical determinations of the portal of entry have only limited value, since the permanent changes in the regional mesenteric lymph nodes, analogous to the primary complex in the lungs, do not always occur. After infection the stage of lymphoid latency occurs, developing into manifest tuberculosis or healing.—*Über die Infektionswege der Tuberkulose. Bemerkungen zu Beitzke's Ausführungen zu diesem Thema, B. Lange, Ztschr. f. Tuberk., 1925, xliii, 176.*—(*H. J. C*)

Avian Tuberculosis in Man.—As a rule, all the characteristic tissue changes of tuberculosis are lacking in avian tuberculosis in man. There occur widespread disturbances in the bone-marrow and kidney. The postmortem picture is often that of sepsis, and during life paratyphoid fever is frequently diagnosed. Clinical diagnosis presents the greatest difficulty. The patient suffers from pyrexia for years, and gives the impression of a favorable sepsis but does not react to antipyretics. The disease can also resemble leukemia. In cases with prolonged febrile reaction it is advisable to examine the blood and urine. In the latter there occur large numbers of tubercle bacilli with few epithelial cells. Biologically, the patient reacts severely to avian tubercle bacilli. In animals the disease is an outspoken ingestion tuberculosis, the intestines, liver, peritoneum and ovaries becoming diseased early. Eggs contain large numbers of tubercle bacilli which are resistant to heat. In soft-boiled eggs the bacilli are not killed, but they are in hard-boiled eggs. Treatment consists of using tuberculin prepared from avian tubercle bacilli.—*Das Krankheitsbild der Hühnertuberkulose beim Menschen, E. Loewenstein, Ztschr. f. Tuberk., 1924,* xli, 18.—(*H. J. C.*)

Tuberculous Infection by Mouth, Nose and Conjunctiva.—Guinea pigs could be infected even with doses of 0.000,01 to 0.000,000,000,1 mgm. tubercle bacilli. The irregular development of infection in part of the animals is due to differences of natural resistance of the animals. Repeated infections did not lead to a greater number of takes. The absence of primary lesions in the mucous membranes or their tributary lymph nodes cannot exclude these as portals of entry. In most cases the course of tuberculosis following oral, nasal or conjunctival infection was less malignant than by parenteral or inhalation infection. The common view that infection *per os* occurs only after the introduction of larger numbers of bacilli and therefore, is of no significance, appears incorrect. The resistance of the young child almost parallels that of the guinea pig. The similarity of the disease in childhood cervical lymph-node tuberculosis and that of guinea pigs infected *per os* was striking. Contact and food infection in the child must be fairly frequent. The question of the most frequent mode of infection is undecided. However, that by way of the lungs is the most dangerous.—*Untersuchungen über orale, conjunctivale und nasale Infektion mit Tuberkelbacillen, B. Lange, Ztschr. f. Hyg., 1924, ciii, 1.*—(*H. J. C.*)

Droplet or Dust Infection in Tuberculosis?—In the homes of consumptives dust was infectious to only a small percentage of guinea pigs. Cough droplets are usually 100 to 500 micra in size, and those of 20 micra, as tested by Lange, are rare. After ruling out errors of method, the droplets in pulmonary infection measure between 50 and 250 micra, the majority being 70 to 85 micra. It is pointed out also that this is only one of the many conditions of droplet infection which must be considered.—*Über die Bedeutung der Tröpfchen-*

und Staubinfektion bei der Tuberkulose. Zugleich eine Entgegnung auf B. Langes und seiner Mitarbeiter letzte Veröffentlichungen zu diesem Thema, W. Strauss, Ztschr. f. Hyg., 1925, cv, 416.—(*H. J. C.*)

Dust Infection Most Probable in Tuberculosis.—Since droplets 100 micra in size never reach the lower air-passages, and those from 20 to 100 micra rarely do so, it is believed that bacillus-laden bronchial droplets do not cause infection in guinea pigs, and that probably this is also true for man. Only with marked excretion of bacilli do the small droplets, between 2 and 20 micra, contain bacilli. In primary pulmonary infection, therefore, droplet infection plays only a slight rôle. Of greater significance is bacillus-laden dust.—*Experimentelle Untersuchungen über die Bedeutung der Tröpfchen und Staubinfektion bei der Tuberkulose, B. Lange, Centralbl. f. Bakt., Abt. I, Orig., 1924, xciii, 66.*—(*H. J. C.*)

Infection from Cough Droplets Most Important.—Dust infection plays a markedly subordinate rôle in comparison with droplet infection. The prevention of early infection is almost impossible in association with open tuberculous individuals and can be attained only by a thorough respect of distance.—*Zur Tuberkulosebekämpfung: unmittelbare Ansteckung durch Hustentröpfchen oder mittelbare durch verstäubten, mikroskopischen Auswurf? K. Jellenigg, Beitr. z. Klin. d. Tuberk., 1925, lxi, 256.*—(*H. J. C.*)

Dissemination of Cough Droplets in Phthisis.—In coughing, droplets are projected to a distance of 42 inches, while the vertical expanse is dependent upon the force and extent of cough. The condensation of droplets is greatest in the central parts of the spray. The percentage of droplets containing tubercle bacilli decreases with increase of distance from the consumptive. In the cough of healthy individuals and during speaking, as a rule, only mouth droplets are expelled.—*Zur Verstreuung von Hustentröpfchen durch Phthisiker, J. Siegl, Beitr. z. Klin. d. Tuberk., 1925, lxi, 286.*—(*H. J. C.*)

Infectiousness of Saliva in Pulmonary Tuberculosis.—The figures on the presence of bacilli in the saliva are variable. As a result of the examination of 74 consumptives with tubercle bacilli in the sputum, 5 (6.7 per cent) revealed tubercle bacilli in the mouth and pharynx. Tubercle bacilli were found more frequently in the crypts of the tonsils; 50 open consumptives gave positive findings in 7 cases (14 per cent).—*Ist der Speichel der Tuberkulösen infektiös? R. Hollmann, Zeitschr. f. Tuberk., 1924, xli, 127.*—(*H. J. C.*)

Reinfection in Tuberculosis.—Endogenous reinfection should be spoken of as metastatic reinfection, and exogenous reinfection as superinfection. The highest incidence of tuberculosis among groups of people occurs among those from households in which there has been tuberculosis. Superinfection can lead to late or tertiary phthisis, but there may be also metastasis in the same person. When morbidity rates in tuberculosis of childhood are compared with conjugal mortality statistics, a good case can be made out for superinfection.—*Die späte exogene Reinfektion als Ursache der tertiären Lungenphthise, J. W. Samson, Deutsche med. Wchnschr., July 10, 1925, li, 1144.*—(*H. S. W.*)

Factory Ventilation and Industrial Tuberculosis.—The existence of a form of tuberculosis specifically related to industrial employment has been recognized from very ancient days. Hippocrates speaks of the metal miner as a man who "breathes with difficulty" and "is of wan complexion." Agricola, in his book on metallurgy (published in 1586), calls attention to the dust of the mines, and says that if it has corrosive qualities, it eats away the lungs and implants consumption in the body. To-day the problem has changed little, but we know that the causative factor of the high incidence of tuberculosis in certain dusty industries is exposure to finely divided silica dust. Other dusts, such as coal and cement, while apparently causing an excessive incidence of acute respiratory disease, produce a state of immunity rather than one of increased susceptibility, as far as tuberculosis is concerned. This is indicated by the statistics of Hoffman, who found that the coal-mining districts have a mortality from acute respiratory diseases 28 per cent above normal, but that these same districts have a tuberculosis mortality 21 per cent less than that for the rest of the state. The fact that silica dust is less readily removed from the lung than coal dust, and therefore causes a higher degree of fibrosis with consequent blocking of the lymph channels of the lung is thought by Krause to be the reason why silicosis predisposes to tuberculosis and anthracosis does not. Figures indicative of the havoc of tuberculosis among workers exposed to silica dust are given by Hoffman. Among granite cutters in Vermont, 1915–1918, there were 1,064 deaths per 100,000 population as compared with 108 per 100,000

for the adult population of the state. Similarly, in a Connecticut ax factory, among polishers and grinders, the death rate per 100,000 was 1900, in the state as a whole 150, and in other employees of the ax factory 160 per 100,000. Figures showing the comparative mortality from pulmonary tuberculosis in certain occupations show a uniformly higher rate in those in which the workers are exposed to silica dust, as earthenware manufacturers, tool makers, and tin miners. It is, therefore, obvious that more emphasis should be placed on control of these dust hazards, as by the use of wet or enclosed processes, or special exhaust ventilation. In some instances, as in sandblasting of large castings, respirators should be worn. In regard to the relative weight of various factors in the determination of the prevalence of tuberculosis, there is no single factor which shows so clear and striking a statistical relation to the tuberculosis death rate as exposure to the inhalation of silicious dusts.—*Factory Ventilation and Industrial Tuberculosis, C.-E. A. Winslow, J. Am. M. Ass., September 26, 1925, lxxv, 968.*—(*E. H. K.*)

Tuberculosis in Chemical Industries.—The employees of a large chemical industry were examined, and in 2¾ years there occurred 113 cases of open pulmonary tuberculosis, with 34 deaths. As a result of this study the view is taken, in opposition to Bachfeld, that the workers in the chemical industries are not very frequently afflicted; as a matter of fact, less frequently than ordinary laborers. The crucial point in the effect of occupation upon tuberculous infection would seem to be, not the type of work, but the energy expended. The limit of performance of the workers is not overstepped in the chemical industries, as a rule, and the danger of infection is associated with direct contact with tubercle bacilli. Infection among the workers is only slight. There is no chemical occupation which lowers the resistance of the workers. The mobilization of latent pulmonary lesions by means of irritating gases or dust is as rare as traumatic tuberculosis of bones and joint.—*Tuberkulose und chemische Industrie, Rodenacker, Beitr. z. Klin. d. Tuberk., 1924, lxix, 1233.*—(*H. J. C.*)

Calcium and Tuberculosis.—Nearly 4,000,000 persons in the United States have employment in which they are exposed to dust, and of these 3.6 per cent are exposed to dusts comparatively high in calcium, as, for instance, gypsum, lime and cement, marble and stone, plaster, etc. These dusts tend to have a low silica content, and either to coalesce in water or go into solution. It is known that the incidence of tuberculosis among workers in these dusts is strikingly low as compared to that of people working in silica. Many claims have been made to the effect that calcium is a decidedly good therapeutic agent in clinical tuberculosis and in tuberculosis in experimental animals. To test the effect of inhalations of hydrate of lime on pulmonary tuberculosis of rabbits, experiments were conducted in such a way as to determine the effect of the lime on lungs of normal rabbits, those in which tuberculosis had been previously set up, and those in which, after dusting, the infection had been superimposed. A virulent bovine strain of tubercle bacilli was used. Animals were exposed six hours daily for thirty consecutive days, and certain of them from the various groups killed at intervals after the dusting up to five months. The dust, although acting as a mild irritant, did no permanent damage to the lungs, probably because of its partial solubility and partly from lack of sharp edges on the particles. In animals inoculated with tubercle bacilli after exposure to lime, there was a slight retardation of the evolution of disease but this retardation was more evident in the group of animals in which exposure to lime followed the inoculation.—*Calcium and Tuberculosis: A Thesis in Hygiene Comprehending the Influence of an Inspired Dust on a Specific Infection of the Lungs, Miriam S. Iszard, J. Industr. Hyg., November, 1925, vii, 505.*—(*H. S. W.*)

Pneumonokoniosis and Tuberculosis among Ruhr Coal Miners.—An examination of hospital cases revealed that of 103 coal miners that had been in the work for 10 years or more, 30 per cent showed penumonokoniosis roentgenologically, while of 66 stone-masons 70 per cent revealed pneumonokoniosis, mostly of a severe type. Among stone-masons with pneumonokoniosis there was found in most cases a high-grade secondary tuberculosis. Among 95 coal miners in this occupation over 10 years there were 5.3 per cent with open tuberculosis, and 2 other cases revealed, clinically and roentgenologically, a fibrotic closed tuberculosis. In all, there were 18 per cent which had then or previously suffered tertiary pulmonary tuberculosis. Among the stonemasons 12 per cent were open, 8 per cent definitely active, and 23 per cent were or had been in the tertiary class. It is believed that the sharp stone particles produce mechanical injury, which easily leads to tuberculous reinfection. In this the type of stone dust plays a definite rôle.—*Staublunge und Tuberkulose bei den Bergar-*

beitern des Ruhrkohlenbezirks, A. Böhne, Beitr. z. Klin. d. Tuberk., 1925, lxi, 364.—(H. J. C.)

Tuberculosis among Physicians and Nurses.—The figures on tuberculosis morbidity and mortality among physicians are entirely inadequate. The English statistics indicate that physicians have a higher tuberculosis mortality than clergymen, teachers, and those of other professions, but the figures are lower than the average total figures for all people. Most tuberculosis among physicians was found in the university clinics, 1.76 per cent; less in the hospitals, 0.72 per cent; and least in the special institutions for pulmonary tuberculosis, 0.35 per cent. The nursing staffs in these places were more endangered. In the medical clinics the figures ran 2.42 per cent, in special institutions for pulmonary cases 1.89 per cent, and in general hospitals 1.36 per cent. Of a total of 2,861 physicians, 22 (0.77 per cent), and of 14,140 nurses 203 (1.44 per cent) were affected. The danger of infection is thus double among the nurses.—*Tuberkuloseerkrankungen und -todesfälle bei Ärzten und dem Pflegepersonal und die Frage der Dienstbeschädigung, M. Kirchner, Ztschr. f. Tuberk., 1925, xliii, 345.—(H. J. C.)*

Tuberculosis Following Professional Care of Patients.—Two cases are reported, one in a nurse who was previously definitely nontuberculous, and in whom a mild apical pulmonary tuberculosis developed one and one-half years after entering tuberculosis work and in the course of another year developed into a severe open case of pulmonary tuberculosis. The second case was that of a physician, who had previously been infected but had never developed tuberculous disease, and in whom the disease set in later, while associated with a tuberculosis division of a hospital.—*Einige Fälle von Erkrankung an Tuberkulose infolge von Dienstbeschädigung bei der Behandlung und Pflege Tuberkulöser, Braeuning, Ztschr. f. Tuberk., 1925, xliii, 441.—(H. J. C.)*

Lead Poisoning and Tuberculosis.—Chronic lead poisoning had no influence upon the spread of tuberculosis in rabbits infected with bovine tubercle bacilli. The increased incidence of tuberculosis in the lead trades is not dependent upon a specific action of the lead.—*Untersuchungen über Konstitution und Krankheitsdisposition. VII. Versuche über die Beziehungen zwischen Bleivergiftung und Tuberkulose, K. Kisskalt and F. Schütz, Ztschr. f. Hyg., 1924, ciii, 560.—(H. J. C.)*

Effects of Rainbearing Winds on Pulmonary Tuberculosis.—Statistics taken from Shropshire, Derbyshire, and Devonshire, and the distribution of phthisis and pneumonia in the United States led to these conclusions: *1:* Direct impact of wind on persons exposed can excite disease. *2:* House shelter from wet winds does not seem to protect phthisical patients who are exposed when out of doors. *3:* Personal exposure out of doors predisposes to phthisis even when the houses are not exposed. *4:* Dampness of houses caused by dampness of soil has much less effect in predisposing to phthisis than exposure of the district to wet wind. It seems at least very probable that the proved influence of these strong prevalent rainbearing winds is due to some direct effect produced on the persons exposed to them, rather than to any indirect influence exerted through their houses, and actual experience bears out that view.—*The Effects of Strong Prevalent Rain-Bearing Winds on the Commonness and on the Course of Phthisis: How are they Produced? W. Gordon, Brit. J. Tuberc., January 1926, xx, 20.—(J. C. D.)*

Pulmonary Tuberculosis and Pregnancy.—Although medical literature is filled with articles on the significance of this association there is a singular discrepancy in the conclusions which leaves one in doubt. Perhaps an important reason for such a disagreement lies in the remarkable lack of association between obstetrics and medicine. Even in the best obstetrical clinics only the gross thoracic lesions are picked out for consultation, and the follow-up system for these is faulty. Too often the physical examination of obstetrical patients will include a general look at the patient, a rapid auscultation of heart and apices of lungs, and practically no general medical history. A second factor is that of the social status or financial resources of the patient. It is well recognized by phthisiotherapists that the great essential in the treatment of tuberculosis is rest. This is doubly true for the pregnant woman with tuberculosis. In general, the normal woman, after becoming pregnant, continues her daily routine, which requires much physical drudgery, with few moments of rest. Pregnancy becomes an additional drain on a physical reserve that is always in danger of being overdrawn. Naturally the woman whose pulmonary lesion is just kept in check under ordinary circumstances will succumb to the added drain. This is only common sense. On the other hand, if the woman is so situated that she can obtain six months' rest from household or other duties, especially in surround-

ings away from the mental worry of servants, children and telephone, it is not unreasonable to suppose that her physical condition may improve. This study is based on a review of the first 14,000 histories of the indoor obstetrical service of the Johns Hopkins Hospital. In this series the obstetrical cards give 134 patients who were grouped as having some form of pulmonary tuberculosis. This number roughly corresponds to the morbidity percentage of the city of Baltimore as obtained from the Health Department, and is in all probability in both instances below the actual figures. The group mentioned contained both whites and blacks, with a large number of multiparae. It may be said, then, that although there is reason to believe that gestation and the puerperium may serve as the final factor to "break down" patients who have tuberculosis, there is no evidence that pregnancy in any way promotes the incidence rate. The 134 patients studied were grouped as follows: (1) questionable tuberculosis, (2) definite but inactive tuberculosis, (3) definite active tuberculosis subjected to therapeutic abortion, (4) definite active tuberculosis with no therapeutic abortion, and (5) tuberculosis associated with other diseases. *Pregnancy with questionable tuberculosis:* There were 50 such cases. They had 45 healthy normal babies, whose birth weight averaged 3,432 gm., or slightly above the general average. There were 4 spontaneous abortions or premature births and 1 stillbirth, which again compared favorably with the general average. *Pregnancy with definite but inactive tuberculosis:* There were 17 such cases, 10 with clinically unilateral and 7 with bilateral disease. For 10 cases follow-up notes are available for six to twelve years after delivery. None of these patients died, and 7 of the 10 were in excellent condition from six months to five years after delivery. All but 2 of the 17 had normal full-term babies. The histories of those who had recrudescences are not convincing that the pregnancy was to blame, and they were no more numerous than among nonpregnant women with inactive tuberculosis and did not occur until several years after the pregnancy. Probably the wear and tear of their particular lives would have resulted in relapse if they had had no babies. Nor did the length of time before pregnancy of the discovery of tuberculosis seem to influence the after-result. If our general concepts of pulmonary tuberculosis are applied to these patients, with the realization that it is almost impossible to determine when the disease is cured, it is not so evident that the pregnancy is the essential feature. Obstetrical patients do not turn up at the tuberculosis dispensary at all frequently, whereas it is common for them to return to other departments. *Pregnancy associated with active tuberculosis:* There were 31 patients in this group, all of whose case-histories are carefully detailed, both as to pregnancy and later, as far as was possible. With one exception in the case of a rachitic pelvis these patients were not subjected to operative delivery. There were 4 spontaneous premature births, 2 deaths, 2 spontaneous abortions at six and four months, and 23 babies were discharged at the end of two weeks in fair condition. Their average birth weight was 2,808 gm., definitely below the average for the service. Of 20 women who could be sufficiently observed, 2 (10 per cent) were improved, 8 (40 per cent) unimproved and 10 (50 per cent) dead one year after delivery. We may compare these figures with those obtained from 72 consecutive cases of actively tuberculous nonpregnant women in the Phipps Tuberculosis Clinic, which show, at the end of a year, 25 per cent improved, 33 per cent unimproved, and 32 per cent dead. While the number of cases is small, the figures show a definitely unfavorable prognosis for the pregnant woman. A more careful analysis leads to the conclusion that an active tuberculosis, except in the third stage of severity, has been followed by about a 10 per cent worse outcome than in nonpregnant women. Also, the pathological finding of fresh implantation in the lungs is indicative of recent exacerbation. Even in the patients who did not die, pregnancy was deleterious to the pulmonary condition, as a general rule. *Pregnancy associated with tuberculosis and therapeutic abortion:* There were 12 such patients, and all the abortions but one were done between the second and third months of pregnancy. Of 9 patients followed, 2 (22 per cent) were living and improved at the end of a year, 2 (22 per cent) living and unimproved, and 5 (57 per cent) dead. Comparison with the preceding group indicates no advantages as a result of the operation. If these results are substantiated, operative procedures should be discontinued in pregnancy complicated by active pulmonary tuberculosis, although it is conceivable that operation under spinal anesthesia might result in less shock. *Inactive tuberculosis with therapeutic abortion:* There were 7 such patients, and all were doing well at the end of a year, results, which are, however, no better than in the case of those allowed to go to term. *Pregnancy associated with tuberculosis and other diseases:* There were 19 such patients. The other diseases included syphilis (5 cases), chronic nephritis (3 cases), cardiac disease, eclampsia, and postpartum septicemia. When the tuber-

culosis was active the results were almost uniformly bad; when inactive, they depended on the severity of the concomitant disease. *Conclusions:* It is the algebraic summation or proportion of work and rest in the individual's daily life that, beside the particular type of lesions, seems to control the prognosis. Bernard is doubtless right in saying, "It is better where one is tuberculous to not become pregnant," as the risks of pregnancy are definitely increased by tuberculosis and *vice versa*. But this risk is by no means prohibitive in inactive cases, provided the household duties can be controlled, additional rest obtained, and the lesion be of fibroid type and have been quiescent at least three years; so that, when there is an overwhelming desire for children, the risks of pregnancy may be assumed. What shall we do in the case of a pregnant woman in whom active tuberculosis is found? Treat the tuberculosis to the uttermost, and disregard the pregnancy. Rest, preferably in a sanatorium, under those physicians whose life's business is treating tuberculosis, is to be urged. Issue is taken with the host of writers who advise terminating the pregnancy at once, and it is believed that at no stage is operation warranted. The excitement, the etherization, the shock, are additional factors that curtail the patient's strength just when resistance is most needed. On the other hand, a later sterilization, after the patient has been through her pregnancy, and the tuberculosis become quiescent, is to be seriously considered. It is obviously taking undue risk to allow a tuberculous mother to be subjected to repeated pregnancies and possible recrudescences of her disease. The next important problem is the child. When the mother is actively tuberculous its chances of escaping serious infection are poor unless it is removed at once from the mother. The custom at the Johns Hopkins Hospital obstetrical clinic is to take the babies at once and provide wet-nurses or artificial feeding, and, when possible, subsequent institutional care. In France the familial placement system in the country has worked well. Even in patients with quiescent tuberculosis one should advise as short a nursing period as is compatible with the fair interest of the child.—*Pulmonary Tuberculosis and Pregnancy.—E. W. Bridgman and V. Norwood, Bull. Johns Hopkins Hosp., February, 1926, xxxviii, 83.*—(*A. P.*)

Measles Treated Prophylactically by Serum and Tuberculosis.—Tuberculin hypersensitiveness is less constant and of shorter duration in measles modified by prophylactic injections of serum than in the usual form of the disease. In 6 children, in whom the tuberculin reaction during the exanthematous stage was positive, the serum treatment did not cause any undesirable effects, while in 5 tuberculous children with negative tuberculin reactions there was a decidedly unfavorable progress.—*Mit Rekonvaleszentserum behandelte, abortive Masern und Tuberkulose, A. Wallgren, Beitr. z. Klin. d. Tuberk., 1925, lx, 260.*—(*H. J. C.*)

Difficulties in Diagnosis of Tuberculosis in Infancy.—Basing his observations on only the active cases of tuberculosis (excluding those discovered accidentally by the Pirquet reaction, for example) Kopec found at the Charles-and-Mary Hospital at Warsaw 12.8 per cent of diseases in infants to be due to tuberculosis. Mikulowski notes that tuberculous meningitis occurs with greatest frequency during the first two years of life, and that on account of the variability of the pathological signs, lumbar puncture is often delayed. In tuberculous meningitis, Brudzinski's neck sign (passive flexion of the neck producing flexion of the legs) appears earlier and more constantly than the Kernig and Babinski signs. Brudzinski's sign was positive in all of Mikulowski's cases. The cheek sign (pressure on the cheeks just below the zygomatic processes producing rapid elevation of the upper extremities with flexion of the elbow) and the pubic sign (pressure on the pubes producing retraction of the lower extremities), both described by Brudzinski, may be elicited early in meningitis, especially the tuberculous variety. Mikulowski cites the work of Jonscher on the refractometric index of the cerebrospinal fluid, showing that this index is higher in the inflammatory states. An index higher than 1.3349 indicates meningeal inflammation, often serving as a danger signal before the Nonne-Apelt and cell-count become abnormal. In the early diagnosis of tuberculous tracheobronchial lymphadenopathy in infants, Genevrier's sign (transmission of heart sounds under the right clavicle to the right axilla), in conjunction with the other signs of this condition, has been of great value. Tracheobronchial adenopathy or pulmonary involvement, following measles or whooping-cough, can hardly be distinguished from tuberculous processes. The bronchiectases following whooping cough offer further diagnostic difficulties. Examination of the stools of infants for tubercle bacill was always positive when the bacilli were found in the sputum, and occasionally positive when no sputum was obtainable (and in the absence of symptoms of intestinal tuberculosis). Working with tuberculosis antigen furnished by Besredka, Mikulowski found in a series of 106 infants a positive fixation

test in 75 per cent of active cases of tuberculosis of the lungs, bones, joints and serous membranes. In the early latent forms of tuberculosis of the lymph nodes and lungs the reaction was positive in 65 per cent. This reaction, in conjunction with other tests of known value, should be considered a useful diagnostic aid. Cieszynski found that a diminution of the refractometric index of the blood plasma is a bad prognostic sign; also that an elevation in the number of lymphocytes is a good prognostic sign. Mlle. Tabaczynska, also working in the Charles-and-Mary Hospital, studied flocculation of heated defibrinated plasma in the course of different forms of tuberculosis, infectious diseases, and pneumonia. Her results to date are inconclusive.—*Difficultés du diagnostic de la tuberculose chez les enfants, V. Mikulowski, Arch. d. Méd. d. Enf., November, 1925, xxviii, 675.—(P. J. W.)*

Anatomy and Genesis of Tuberculosis in Infants.—The material of the Prague Institute was arranged according to the divisions of Moll, and divided into those from 1 to 6 months and those from 6 to 12 months. In the former group there were 5 cases exhaustively studied. The results indicated that infection resulted in the typical primary complex of the lung with hematogenous miliary tuberculosis of the other organs. The pulmonary lesion must be considered as the source of the other disease. Sixteen cases between the ages of 6 and 12 months are described. There was no essential anatomical difference between the two groups. In elaboration from a statistical standpoint, 87 cases are presented which agree with the foregoing conclusions.—*Zur Anatomie und Genese der Säuglingstuberkulose, A. Ghon, H. Kudlich and F. Winternitz, Ztschr. f. Tuberk., 1925, xlii, 3 and 97.—(H. J. C.)*

Tubercle Bacilli in Pharynx in Infants.—Guinea-pig inoculation revealed the presence of tubercle bacilli in the pharynx in two-thirds of those infants giving a positive skin reaction. Only one-fifth of those with positive sputum survived. Infants with a positive skin test should be isolated until guinea-pig inoculation is proved to be negative.—*Prèsence du bacille de Koch dans le pharynx de nourissons, Lesné and Langle, Meeting, Académie de Méd. de Paris, June 9, 1925, reported in Presse Méd., June 13, 1925, no. 47, 791.—(E. H. K.)*

Miliary Tuberculosis in Infant Twenty-Eight Days Old.—The patient was a poorly developed and poorly nourished baby 28 days old, pale, thin, with marked abdominal distention, and with anorexia as the chief complaint. He had slept most of the time since birth. During his two days in the hospital, attempts to reduce the distention were unsuccessful. The temperature was normal. Rectal examination and complete general examination were negative. On postmortem examination, a large amount of clear yellow liquid was found in the peritoneal cavity; the intestines were greatly distended. Miliary tubercles were found in large numbers in the peritoneum, speen, liver, lungs and mediastinal lymph nodes. There was massive central tuberculous pneumonia. None of the minute tuberculous areas had gone so far as to produce giant cells or epithelioid cell-masses characteristic of more mature tubercles. The tubercles contained tubercle bacilli in large numbers. The placenta in this case appeared normal. The author concludes that a true latent congenital tuberculosis is both possible and probable.—*Miliary Tuberculosis in an Infant Twenty-Eight Days of Age, H. M. Gilkey, Arch. Pediat., September, 1925, xlii, 600.—(P. J. W.)*

Pulmonary Tuberculosis with Cavity in Infants.—Cavities are not rare in tuberculosis of infants, occurring in about one-third of the cases, and as high as 50 per cent of the cases have caseous foci. The frequency increases with age and the size varies. Usually there is only one, but sometimes the cavities are numerous. In the majority of cases the cavity originates from the primary focus.—*Über kavenöse Säuglingstuberkulose, A. Ghon, Ztschr. f. Tuberk., 1925, xliii, 3.—(H. J. C.)*

Tuberculosis in Children.—School children, between the ages of 6 and 9 years, examined by the Pirquet test, showed an increased incidence of reaction in those of weaker constitution. It is believed that in a large number of the children a poor constitution has its foundation in tuberculosis. However, it cannot be disputed that tuberculosis may have nothing to do with certain defective constitutions. However, Pirquet-positive children must be suspected of tuberculosis and treated accordingly, even though it may be true that weakness with a positive Pirquet may not mean the existence of tuberculous disease.—*Beitrag zur Frage der Tuberkulose im Schulkindesalter, Prenzel and Arnold, Ztschr. f. Tuberk., 1924, xli, 51.—(H. J. C.)*

Tuberculosis in Childhood.—It may be that children, who react positively to tuberculin but do not develop tuberculosis, are the ones who, at the time of first infec-

tion, had a high degree of resistance against the bacillus while those with lessened resistance succumbed to the initial infection. It is probable that droplet infection is the chief source of infection but ingestion is also an important source. Pulmonary tuberculosis is not common in children, but when it occurs it comes on more or less suddenly and not from foci in the lung, but from the blood (from tuberculosis in the abdomen). Latent tuberculosis does not exclude the appearance of new foci elsewhere in the body.—*Der Einfluss der Pädiatri auf unsere jetzigen Kenntnisse von der Tuberkulose, A. Czerny, Deutsche med. Wchnschr., December 5, 1924, l, 1733.*—(*H. S. W.*)

Epidemiology of Ambulant Tuberculosis in Children.—Morbidity and mortality of the nursling are related to the degree of exposure to infection, and the infection is divided into superinfection and reinfection, as well as intrafamily and extrafamily. Diseased children were observed over a period of 3 years, and the relation to the first infection was determined. The resulting disease was fourd to be dependent upon two main factors, the type of the infection and the condition of allergy or anergy of the body at the time of infection.—*Die Epidemiologie der ambulanten kindlichen Tuberkuloseformen, F. Redeker, Ztschr. f. Tuberk., 1925, xliii, 89.*—(*H. J. C.*)

Frequency of Tuberculous Infection at School Age.—A single Pirquet test, read after 48 hours, gives no indication of the incidence of tuberculous infection in school children, and is, therefore, of no value for statistical purposes. Pirquet and intracutaneous tests should be repeated, with longer periods of observation of the reactions.—*Zur Häufigkeit der tuberkulösem Infektion im Schulalter. Schlussbemerkung auf die Erwiderung von F. Klose in Bd. 57, H. 2, O. Wiese, Beitr. z. klin. d. Tuberk., 1924, lix, 627.*—(*H. J. C.*)

Intracutaneous Tests with Human and Bovine Tuberculin.—Summarizing the work of several authors, it was found that many patients reacted to but one type of tuberculin, the human type giving more positive reactions than the bovine. Downing and Higgins believe that a negative Pirquet reaction in a suspicious case should indicate several repetitions of the test. The intracutaneous method detects a much higher percentage of tuberculous cases. During the past year, routine intracutaneous tests have been made on all children admitted to the pediatric service of the Cincinnati General Hospital, using Koch's Old Tuberculin for the human tuberculin test, and bovine bouillon filtrate for the bovine, 0.1 cc. of a dilution of 1:1,000 being injected.

Results in 51 cases with positive tests

Reaction to human tuberculin alone	3
Reaction to bovine tuberculin alone	8
Reaction to both, but more markedly to human	6
Reaction to both, but more markedly to bovine	14
Reaction to both with same intensity	20
	51

From the fact that 8 of the 51 cases of tuberculosis (16 per cent) gave a negative reaction with an intracutaneous test with Old Tuberculin, the value of the tuberculin test is increased considerably if it is made with both types, either in separate tests or combined. Evidence from two cases tends to confirm earlier reports that in the first stages of tuberculosis the patient will react to but one type of tuberculin, presumably that of the infecting type, while later the patient reacts to other types (group reaction.).—*Intracutaneous Tests with Human and with Bovine Tuberculin, H. F. Downing and H. L. Higgins, Am. J. Dis. Child., February, 1926, xxxi, 178.*—(*P. J. W.*)

Tuberculosis Survey of Ontario Children.—This survey is one of a number of provincial surveys planned by the Canadian Tuberculosis Association. It was made possible by grants from the Canadian Red Cross Society and its Ontario divisions. Physical examinations of the children were made by members of the Hamilton Medical Society, and tuberculin tests and chest examinations by the staff of the Mountain Sanatorium. Compilation of the tables was supervised by the Director of Vital Statistics in the Provincial Department of Health. The area finally decided on by the Provincial Committee for the survey was the town of Dundas and the adjoining township of West Flamboro, Ontario. The latter is fairly typical of the agricultural townships of older Ontario, while the population of Dundas, although mostly native, is partly industrial. The survey included 1,392 children of school and preschool age, and X-ray studies were made on 1,015. The intracutaneous tuberculin test was used, 0.05 mgm. of O. T. being injected as 0.02 cc. of a 1 to 400 dilution with a fine needle in the upper forearm. It was found that 426 children, or 32 per cent, reacted to this test. It was gratifying to find no cases of open or gross tuberculous disease. The proportion in various age-groups of reactors, when compared with

similar group studies in St. Louis, Missouri, (Veeder and Johnston), Vienna (Hamburger and Monti, and Pirquet), Framingham, Massachusetts, and Saskatchewan, is found in each instance to be lowest in Ontario. Up to the age of 10 years the incidence of infection is the same for boys and girls; but in the age group of 10 to 14 the percentage in girls rises more rapidly in the towns, and in boys in the country. Single X-ray films only were taken. The pictures were taken in the upright posture, using duplitized films and double intensifying screens, with a uniform target film distance of 28 inches and exposures of 0.4 to 1.5 seconds, the timer checked against a metronome and found reasonably accurate. The reports were brief, and based on the report of Pancoast, Dunham and Baetjer to the National Tuberculosis Association of the United States. Of the positive tuberculin reactors 64 per cent showed increased or abnormal shadows, and of the negative 44 per cent. It was soon realized that successive simple respiratory infections could produce increased shadows, and that, in the absence of conglomerate tubercle shadows, definite apical lesions, cavitation, etc., a diagnosis of pulmonary tuberculosis from the X-ray film alone was unwarranted. The following conclusions were reached with regard to physical signs: *1:* Impaired resonance over any part of the chest may be due to conditions other than tuberculosis. *2:* Bronchovesicular or higher pitched breathing is not necessarily pathological or indicative of tuberculosis. *3:* The presence of râles in the chest usually indicates a nontuberculous infection. *4:* Physical signs of mediastinal adenopathy (such as Eustace-Smith or D'Espine sign) may be present in nontuberculous conditions. *5:* Many other conditions besides tuberculous infection produce shadows at the hilum or along the bronchial tree.—*The Results of the Intracutaneous Tuberculin Test in the Ontario Survey of School and Pre-School Children, J. H. Elliott, Tubercle, December, 1925, vii, 122.*—(*A. P.*)

Tuberculous Infection in School Children of Westphalia.—Tuberculin tests done on children in industrial regions of Germany have shown a surprisingly low incidence of reaction. In 1919 to 1921, 47.5 per cent of the dispensary and hospital patients (children, ages not given) sick from other diseases than tuberculosis gave positive reactions, while healthy children of the same age, from day nurseries, kindergartens and orphan asylums, gave reactions in only 26.7 per cent. In a city of 20,000 many of the school-children of six to nine years of age were tested. The children lived for the most part in crowded quarters, three-fourths of them sleeping with other persons, usually adults. Food was usually inadequate. Pirquet tests were done on these children as follows: Of 196 children six to seven years old, 23.9 per cent were positive; of 229 from seven to eight years old, 26.5 per cent were positive; and of 258 from eight to nine years old, 30.6 per cent were positive. Later the Hamburger percutaneous method was employed on school children of the same community with the following results: Of 119 children six to seven years old, 32.8 per cent reacted; of 205 from seven to eight years old, 33.2 per cent reacted; and of 145 from eight to nine years old, 40.7 per cent reacted. From 1921 to 1924 there was an increase of positive reactions of 8 per cent (different type of test is not considered). It is surprising that a group of very poorly nourished children gave no evidence of being poor reactors to tuberculin, but on the contrary gave a higher incidence of reactions than did groups of well nourished or moderately well nourished children. No difference in the incidence of the reaction to tuberculin can be made out between boys and girls. The average incidence of reaction among children six to eight years old is 35.4 per cent.—*Ueber die derzeitige Verbreitung der Tuberkulose unter der Schuljugend des Westfälischen Industriegebietes, A. Hoffmann, Deutsche med. Wchnschr., May 23, 1924, l, 693.*—(*H. S. W.*)

Tuberculin Reactions in Children of Play Age.—A large number of young children in kindergartens in Cologne were tested with tuberculin. Of 1,550 healthy children, ranging in age from two to six and a half years, the Moro test gave results as follows:

	Per cent
Two years	6.19
Three years	12.67
Four years	10.35
Five years	13.41
Six years	15.65
Six and a half years (only 33 examined)	30.33

This incidence is lower than the figures usually given for many other cities, especially Vienna. The real incidence of infection cannot be determined by studying the population of hospitals, dispensaries, institutions, etc., but by studying children from all social strata and in good health. In this study it was found that the incidence was higher in the children from lower social strata.—*Beitrag zur Häufigkeit der Tuberkuloseinfektion im Spielalter, E. Lowey, Klin. Wchnschr., October 28, 1924, iii, 2014.*—(*H. S. W.*)

Factors in Tuberculous Infection of Exposed Children.—From the families of open tuberculous patients 60 nurslings were found which did not react to the tuberculin test. Careful examinations revealed that 80 per cent of these had slight or no catarrh; the hygienic conditions were beyond criticism in 41.6 per cent, and not so in the remainder. For comparison 60 nurslings from open tuberculous surroundings were found which were Pirquet positive at the end of the first year. In 55 per cent of these there was a profuse catarrh and in 26.6 per cent slight or no catarrh. The hygienic conditions were beyond criticism in 25 per cent, but not so in 45 per cent. The mortality of the first group was 26.6 per cent and in the latter 61 per cent. The studies revealed that 36 per cent in satisfactory hygienic surroundings and 53 per cent in unsatisfactory surroundings gave a postive tuberculin test. The largest number of tuberculin-negative nurslings was found in surroundings where contacts were with cases with only slight catarrh. It is considered that the hygienic habits of the diseased individual play the greatest rôle in the infection of the child.—*Warum reagiert ein Teil der Säuglinge aus der Umgebung Offen-Tuberkulöser nicht auf Tuberculin? F. Bennighof, Beitr. z. Klin. d. Tuberk., 1925, lxi, 155.*—(*H. J. C.*)

Spread of Droplets by Tuberculous Children.—The majority of tuberculous infections are set up by cough droplets. Careful clinical observation indicates that droplet infection can also occur from tuberculous children. Tuberculous children of different ages cough out bronchial droplets containing tubercle bacilli only when the sputum is positive. The possibility of spread differs in detail from that of adults. The danger of the phthisical child is determined primarily by the sputum findings, and the strictest prophylaxis should be exercised in childhood in the presence of positive sputum findings.—*Zur Tuberkulosebekämpfung: Untersuchungen über die Verstreuung von Hustentröpfchen beim tuberkulösen Kinde, K. Jellenigg, Beitr. z. Klin. d. Tuberk., 1925, lxi, 267.*—(*H. J. C.*)

Hygienic and Economic Factors in Tuberculosis among School Children.—A study was made of various elementary schools in Folkestone, their locality, hygienic conditions, type of children attending, and number of children referred to tuberculosis dispensaries. It was concluded that: *1:* The incidence of tuberculosis bears a direct ratio to overcrowding, bad home conditions and poverty; much less so to school conditions. *2:* The reverse holds true, that tuberculosis diminishes with access to sunlight, fresh air, and good hygienic conditions and food. *3:* Overclothing and coddling are features in producing delicate children. *4:* Economic and housing conditions overtop all controllable factors in causing tuberculosis.—*Hygienic and Economic Factors in the Incidence of Tuberculosis among School Children, A. Priestman, Brit. J. Tuberc., July, 1925, xix, 148.*—(*A. P.*)

Tuberculous Milk and Children.—If the child that consumes milk containing bovine tubercle bacilli would characteristically fall ill within a short time of his exposure to infection, it would be an easy matter to convince the public that the care and inspection of milk are important. Direct proof is difficult to get, although there ought to be no doubt in one's mind that children may die of tuberculosis set up by the bovine bacillus. Many hold the theory that a few bovine bacilli in the milk merely serve to immunize the child against tuberculosis. No adequate immunizing agent against tuberculosis, however, has yet been found, and it is a serious matter to advocate such a theory as the one mentioned. It possessess too many potential dangers.—*Tuberculosis and the Milk Supply from the Point of View of the Consumer, J. Robertson, Veterinary J., April, 1925, lxxxi, 178.*—(*H. S. W.*)

Relation of Tuberculosis to Malnutrition in Children.—Forty-three per cent of children exposed to tuberculosis ("contact group") are either normal or overweight. Nineteen per cent of this group are definitely malnourished, compared with 36.5 per cent of the control group. Reisman concludes that children with incipient, latent masked and juvenile tuberculosis are not necessarily underweight, nor is such tuberculosis an important cause of malnutrition. There is not a greater incidence of tuberculosis among malnourished children. About 64 per cent of contact cases are infected with tuberculosis. Tuberculosis will frequently be missed if one waits for the signal of malnutrition to suspect it.—*Relation of Tuberculosis to Malnutrition in Children, H. A. Reisman, Arch. Pediat., December, 1925, xlii, 792.*—(*P. J. W.*)

Weight of Pirquet-Positive Children.—The increase in weight of Pirquet-positive children, as compared with non-reacting children, cannot be concluded to be a result of the treatment alone, since this could be determined only by statistics based on all Pirquet-positive children undergoing various types of treatment. In order

further to avoid possible errors the tests should be carried on over a number of years.—*Bemerkungen zu dem Aufsatz von Redeker: über Petruschky-Einreibungen in einer Kinderanstalt in Bd. 58, H. 2 dieser Zeitschrift, Effler, Beitr. z. Klin. d. Tuberk., 1924, lx, 154.*—(*H. J. C.*)

Early Symptoms of Tuberculosis in Childhood.—The primary focus and the coincident disease of the bronchial lymph nodes is a typical form of childhood primary infection. The most frequent symptom of bronchial node tuberculosis is subfebrile temperature, the practical significance of which is slight in diagnosis. The younger the child, the greater is the tendency toward bilateral bronchial node involvement from the primary focus. The determination of the primary focus becomes less possible the older the child. The greater the amount of tuberculous involvement the greater is the tolerance to tuberculin. The majority of tuberculin-reacting children harbor only a minimal amount of infection. Pressure symptoms upon the mediastinal organs occur only with great enlargements. In younger children the character of the cough may be an index of bronchial node tuberculosis. Marked venous stasis must be viewed as of significance. The importance of the D'Espine sign has not been verified. In summary, the physical diagnostic methods for bronchial node tuberculosis, on account of the age and anatomical conditions in the majority of cases, are illusive, and yield results only with marked enlargements and caseation, and especially in young children. The value of the X-ray is also slight. Pirquet taught us to separate the mild from the seriously infected children. The next important step would be to differentiate, by means of simple and harmless methods, the condition of the tuberculous process in the infected, but not manifestly ill children.—*Die Anfangserscheinungen der kindlichen Tuberkulose, S. Engel, Beitr. z. Klin. d. Tuberk., 1924, lix, 522.*—(*H. J. C.*)

Early Symptoms of Pulmonary Tuberculosis in Childhood.—The course of tuberculosis in children is dealt with. No single symptom of chronic disease occurs without the possibility of its being due to tuberculosis, and no single method of testing can replace personal experience. It is more essential to have a positive plan, from which the individual case is evaluated and classified, and for such a plan we are indebted to the investigations of Ghon and Ranke. The following types were considered: isolated apical metastases with and without primary complex, multiple pulmonary metastases, chronic and acute miliary tuberculosis, perihilar inflammation, secondary pulmonary infiltration, chronic open secondary tuberculosis, massive pneumonia and acute caseous pneumonia.—*Über die Früherscheinungen der kindlichen Lungentuberkulose, Simon, Beitr. z. Klin. d. Tuberk., 1924, lix, 529.*—(*H. J. C.*)

Early Symptoms of Tuberculosis in Childhood.—A review of tuberculosis in children. Childhood tuberculosis is not considered to be a separate entity, but of profound significance for the entire tuberculosis problem. The primary complex in the lungs and other organs is dealt with in detail. With Ghon it is believed that the primary focus in the pulmonary apices is rare.—*Die ersten Erscheinungen der Tuberkulose im Kindesalter, Huebschmann, Beitr. z. Klin. d. Tuberk., 1924, lix, 509.*—(*H. J. C.*)

Diagnosis of Hilum Tuberculosis in Children.—Special attention should be given to the roentgen findings in children suspected of hilum or bronchial lymph-node tuberculosis. Fluoroscopy alone is insufficient. Aside from the ventral-dorsal view, oblique X-ray pictures are necessary. The evaluation of the pictures frequently suffers on account of lack of knowledge of the normal hilum shadow in the child. A mere increased hilum shadow in a child does not permit an *a priori* diagnosis of tuberculosis. A coincident careful determination of the reactivity to tuberculin is necessary. Following influenza-pneumonias and pertussis, as well as after measles, infiltration of the hilum lymph nodes may occur, which cannot be distinguished roentgenologically from tuberculous changes. Such nonspecific infiltrations can have as chronic a course as tuberculosis.—*Zur Röntgendiagnostik der kindlichen Hilus- und Bronchialdrüsentuberkulose, K. Brünecke, Beitr. z. Klin. d. Tuberk., 1924, lix, 190.*—(*H. J. C.*)

Hilum Enlargements in Children.—In spite of difficulties in X-ray diagnosis of tuberculous disease of the hilum, a large material carefully studied led to definite conclusions. The determination of enlargement of the tracheal and mediastinal lymph nodes, which is not rare, even in the older child, is simple. According to the changes which these hilum shadows undergo, the cases are grouped into two classes: (1) lymph-node enlargements with extensive caseation and calcification, and (2) those in which complete retrogression can occur in from months to years. These are viewed as a type of epituberculous glandular disease, in development and course similar to epi-

tuberculosis in the lungs. They are seen as an extension of a primary complex, and especially in children infected at the older ages. In early infection mainly caseation and calcification develop. The differential diagnosis between tuberculous and epituberculous glandular swelling from the clinical symptom complex seems impossible. A differentiation of the glandular swellings from perihilar pulmonary infiltration is possible according to the form of the shadow and its differentiation from the surrounding tissue. The glandular swellings in erythema nodosum are considered epituberculous.—*Über hochgradige tuberkulöse und epituberkulöse Hilusdrüsenschwellungen beim Kinde, H. Kleinschmidt, Beitr. z. Klin. d. Tuberk., 1925, lxi, 330.*—(*H. J. C.*)

Types of Ambulant Tuberculosis in Children.—In the year 1924, 2,136 X-ray examinations alone were made. Newly born children were kept under guidance. The material reported on, being mainly children under 3 years, revealed positive Pirquet reactions, without other findings, in 18 per cent of the boys and 24 per cent of the girls; Pirquet-positive with exudative symptoms, 3.1 and 2.9 per cent; small isolated X-ray lesions, 7.9 and 10.2 per cent; active primary-complex and bronchial lymph-node tuberculosis, 0.8 and 0.9 per cent; absorbed infiltrations (bronchial lymph-node tuberculosis), 1.2 and 3.5 per cent; active infiltrations, 0.4 and 0.9 per cent; and indurated infiltrations and areas of secondary induration, 1.4 and 1.6 per cent. There were 3 active and 5 inactive cases of bone tuberculosis and tertiary pulmonary tuberculosis, 0.3 per cent, two cases in boys. The active bronchial lymph-node tuberculosis and infiltration were more evident among the young. Caution is indicated in the evaluation of the d'Espine sign. The variable figures presented by the different authors for the frequency of tuberculosis at school age is believed to be due to the different psychic attitude of the observers. No relation was seen between narrow-chestedness and tuberculous infection. The relation, if it exists, is one of an influencing of the habitus of the child by the tuberculous infection. The Pirquet-positive and Pirquet-negative children showed no differences in their weight and chest curves. Brug's index for measuring narrow-chestedness must be used cautiously, since in normal children there are differing values for the different ages, the younger being more broad-chested, while the older are more narrow-chested. Among the author's material there was a greater incidence of broad-chestedness among the Pirquet-positive cases of both sexes than among the negative. Scrofulosis and bronchial lymph-node tuberculosis were more frequent in the younger ages. It is possible that narrow-chestedness also has no influence upon apical disposition. Isolated X-ray foci are not always identical with the primary complex. Apical primary complexes are rare as contrasted with apical metastases. Two-thirds of the dense foci occur on the right and one-third on the left side. Of 69 primary and secondary infiltrations 26 occurred among boys and 43 among girls; a preference to one side could not be determined. Of 69 infiltrations only 4 were not related to the hilum. One of the most frequently associated symptoms of infiltration was interlobar pleuritis; of 23 cases 18 were in the right lung, thus resembling the dense roentgen shadows.—*Statistik der ambulanten Tuberkuloseformen und Zustandsbilder des Kindes, F. Redeker, Ztschr. f. Tuberk., 1925, xliii, 449.*—(*H. J. C.*)

Tuberculosis of Abdominal Lymph Nodes.—Tuberculous mesenteric lymphadenitis is frequently confused with other conditions. It is rarely diagnosed except at operation or at necropsy. In this study a group of children were selected who were known to have been exposed to tuberculous persons or to be themselves subjects of the disease. If the intracutaneous tuberculin test proved positive, roentgenograms of the neck, chest, and abdomen were taken routinely. For the abdominal pictures, a flat plate (anteroposterior view) was taken without previous preparation of the patient. If lime-salt deposits were present, mineral oil was given on five successive nights, food was withheld on the sixth morning, and a soapsuds enema was given. Four hours later, anteroposterior and lateral plates were taken. Shadows of calcified lymph nodes are oval, rounded or crescentic. They appear white, and are more intense than shadows cast by bone. They present a mottled, stippled appearance. In the majority of the authors' cases, one could count one to five more or less sharply defined nodes in the roentgenograms of the abdomen. Shadows cast by fecal matter are easily differentiated. The finding of calcified nodes in the abdomen does not mean active tuberculosis, nor does their absence mean that the lymph nodes of the abdomen are free from the disease. In the course of this investigation, 120 children were examined, of whom 21, or 17 per cent, had tuberculosis of the abdominal lymph nodes. Eleven of these 21 children came to clinic because of symptoms. In three, these were referable to the abdomen. Four were known to have tuberculosis, and were symptom-free. Six came

merely because of exposure to tuberculosis. In 9 of the 21 cases, there was a known human source of infection. In 13 there were evidences of tuberculosis elsewhere in the body. Besides establishing the locus of a tuberculous lesion, the demonstration of calcified nodes in the abdomen helps to differentiate them from such conditions as appendicitis, sarcoma of the kidney, renal tuberculosis, or stone in the kidney. By repetition of the abdominal plates, evidence should be obtained as to whether calcification is progressing or whether the calcified nodes are increasing or decreasing in size and number.—*Tuberculosis of Abdominal Lymph Nodes: Diagnosis by Means of the Roentgen Ray, E. C. Dunham and A. M. Smythe, Am. J. Dis. Child., June, 1926, xxxi, 811.—(P. J. W.)*

Thoracic Form and Function in Tuberculous Children.—Every chronic disease reduces the muscular tone and causes changes of the thorax of children, especially in those bedridden for a long time. An attempt was made to find out whether tuberculosis influences the entire body, or whether there is a relation between the severity of the tuberculous process and the form of the chest. The form of the thorax in tuberculous and other children was studied according to Hofbauer's "sagittal reduced thorax average." The observations resulted in a classification of two types: (1) children with vertical arched tendency of the ribs and shallow thorax, and (2) those with horizontally arched ribs and rounded thorax. Children of tuberculosis habitus belong, in the majority of cases, in the second group. A relation between the chest, the severity of the tuberculous pulmonary process, and the anatomic type of tuberculosis could not be determined.—*Zur Form und Funktion des Thorax bei der kindlichen Tuberkulose, Hertha Götz, Ztschr. f. Tuberk., 1925, xliii, 450.—(H. J. C.)*

Wheal Formation in Tuberculin-Positive Children.—The "codein reaction" consists of the intracutaneous injection of 0.15 cc. of a 1:1,000 codein solution, which is ordinarily followed by a flush, then by a wheal reaching its maximum in about 8 minutes. The wheal outlasts the flush, disappearing in an hour or somewhat longer. The wheal averages from 1.1 to 1.3 cm. in diameter. Codein and histamin whealing are similar. Increased permeability of the vessel-walls is the principal factor. An efficient circulation is essential for wheal formation. The test was applied in a great variety of conditions. Wheal formation was lessened in all cases of edema studied. In tuberculin-positive children, it was neither greater nor less than in tuberculin-negative subjects. Ten children with positive tuberculin tests were studied. Twenty-five tuberculin-negative children were used as controls.—*Wheal Formation in Infants and in Children, in Edema, Creatinism, etc., and in Tuberculin Positive Subjects, J. D. Pilcher, Am. J. Dis. Child., January, 1926, xxxi, 77.—(P. J. W.)*

Disseminated Tuberculosis in Child.—The patient was sent to the hospital (with negative family and previous history), having had severe abdominal cramps and vomiting for two days prior to admission. Physical findings were perfectly typical of appendicitis, except for a leucocyte count of 6,000. At operation the appendix was found to be normal. The patient became progressively worse. It was not until one month after admission that X-ray of the chest indicated "mottling of both pulmonary fields." An intracutaneous test, 1:500, was positive, the Pirquet being twice negative. Three weeks after admission an irregular mass was felt in the left lower quadrant. At this time the hemoglobin was 58 per cent. The child died very suddenly, two months after admission, with every evidence of intraäbdominal hemorrhage. At autopsy, innumerable miliary tubercles were found disseminated throughout the abominal cavity. There was no calcification of the tubercles. Retroperitoneal and mesenteric lymph nodes were swollen and caseated. Both lungs were studded with tubercles, and the bronchial nodes were caseous. A short distance from the bifurcation of the right common iliac artery, on the surface of the internal iliac, there was a cone-shaped mass, in which was a caseous lymph node. A probe easily passed through this into the lumen of the artery. This was undoubtedly the site of the fatal hemorrhage.—*Disseminated Tuberculosis in a Girl of Seven Years, J. Sobel and J. Geiger, Arch. Pediat., April, 1926, xliii, 235.—(P. J. W.)*

Artificial Pneumothorax in Children.—From 1922 to 1924, inclusive, more than 1,000 cases were sent for observation to the Benjamin Franklin Pavilions of the Debrousse Hospital from the children's hospitals in Paris. It was found that about 9 per cent were suitable for pneumothorax therapy. The pulmonary lesions in these could be considered unilateral, although there was bilateral tracheobronchial adenopathy in practically all cases. Most of the patients were between four and fifteen years of age, and there was a considerable number of girls between eleven and fifteen. At this

age pulmonary tuberculosis is more than twice as frequent among girls as among boys. At first, pneumothorax was practised only in far-advanced cases, with cavities, rapid caseation or severe hemoptysis; later it was applied whenever the involvement was unilateral, as confirmed by X-ray, and there was bacillary sputum or gastric contents, if no expectoration; also in a few cases of tuberculous splenopneumonia. Recently, the proportion treated approximates that of Eliasberg, 19 per cent. The child is prepared by hypodermic injection of scopolamine-morphine, with local anesthesia produced by novocaine. For crying babies a little chloroform is necessary. At the first puncture 50 cc. of oxygen are injected; next 200 to 300 cc. of nitrogen. There has been no serious accident in over 100 cases. In 25 per cent of cases more or less fluid has developed at some time, in all but 2 cases clear and serofibrinous, and usually spontaneously reabsorbed. *Results:* In 70 per cent of the cases, especially among the girls, there has been marked gain in weight and general improvement. Five cases can be considered fully cured, with *restitutio ad integrum* and it is now impossible to tell which lung was diseased. There have been 3 deaths, 2 from empyema and one from meningitis. It is advised to continue the injections at least three years. In a few cases, prematurely stopped for one or another reason, new developments appeared after reëxpansion. In two cases bilateral pneumothorax was done; one died and one is doing well. Of the entire group for 1922–1923, 55 per cent can be considered definitely healed, in excellent general condition, with no bacillary sputum. *Conclusions: 1:* In every case of unilateral pulmonary tuberculosis in children, with bacillary sputum, therapeutic pneumothorax must be done. *2:* There is no other curative method that will cause the disappearance of tubercle bacilli in a few weeks and a real improvement in general health, including ability to engage in sports and games with care. *3:* In certain cases therapeutic pneumothorax is the only means of producing a really complete cure, with the disappearance of all symptoms, with normal physical signs, no bacilli and normal X-ray findings.—*Therapeutic Pneumothorax in Pulmonary Tuberculous Children, P. F. Armand-Delille, Med. J. & Rec., January 20, 1926, cxxiii, 113.*—(*A. P.*)

Lipase Titre of Serum of Tuberculous Children.—The tributyrin method of Rona and Michaelis was used in 41 cases of tuberculosis of children. There were no definite conclusions that could be drawn, to show a relation between the lipase titre and the tuberculosis. It is not believed that there is any relation between the lipolytic power of the serum and the body function.—*Der Lipasetiter im Serum tuberkulöser Kinder, Elizabeth Hecker and Josefa Vierhaus, Beitr. z. Klin. d. Tuberk., 1925, lxi, 303.*—(*H. J. C.*)

Demineralization Coefficient in Normal and Tuberculous Children.—The coefficient of demineralization $\left(\frac{\text{total ash}}{\text{dry extract}}\right)$ of urine of normal children was found to be 0.40 to 0.44. This was little changed in pretuberculous children, but increased to 0.50 in active forms of the disease. Similar variations were found in the coefficient of demineralization of the protoplasm $\left(\frac{\text{chlorine free ash}}{\text{dry extract}}\right)$.—*Le coefficient de déminéralization et les coefficients voisins chez l'enfant normal et chez l'enfant tuberculeux, Dufour and Vellaz, Meeting, Soc. Méd. des. Hôpitaux de Lyon, May 12, 1925, reported in Presse Méd., May 30, 1925, no. 43, 721.*—(*E. H. K.*)

Treatment of Surgical Tuberculosis in Children with Krysolgan.—Krysolgan was used in 24 children with surgical tuberculosis, starting with 0.0001 gm. and increasing to 0.05 gm., at intervals of 1 to 4 weeks over a period of 3 months. No remarkable changes in the findings were noted, with the exception of one case of abdominal fistula which healed rapidly. There were no harmful effects, while definite increase in weight occurred during the treatment.—*Krysolgan bei Kindern mit chirurgischer Tuberkulose, R. Trautmann, Beitr. z. Klin. d. Tuberk., 1925, lxi, 638.*—(*H. J. C.*)

Exercise for Tuberculous Children.—Exercise for patients with tuberculosis is helpful or harmful in proportion as the patients are dealt with individually and systematically. Twenty-three children from ten to fifteen years of age, none of whom had any symptoms of tuberculosis although all of them had either röntgenographic evidences or history of the disease, were given systematic gymnastic exercises under supervision of a physician. The exercise consisted of calisthenics, javelin throwing, running, jumping, etc., for forty-five to sixty minutes, and was done in the summer months in the open air, each child being subjected to the exercise three different times in the course of a few days. Before beginning the exercise the children were kept in bed for half an hour, and the temperature and leucocyte count were taken; the temperature and leucocyte count were taken again immedi-

ately after the exercise and again at the end of a forty-five-minute period of rest. Immediately after the exercise there was an average increase of 0.8°C. in the temperature, which dropped 0.6°C. during the period of rest. The leucocytes showed an average of 37.5 per cent increase, and this during the next forty-five-minute rest had dropped to a point that was 4.5 per cent above that before exercise began. Some exceptions to the average were noted. The increase of leucocyte count did not always parallel the rise of temperature. The rate of return to normal levels after rest is of more importance. Carefully controlled physical activity should give better results in treatment of tuberculosis than too long bed rest.—*Tuberculose und Sport im Kindesalter, Schneider, Deutsche med. Wchnschr., February 26, 1926, lii, 364.*—(*H. S. W.*)

Phthisis of Puberty.—Four postmortem cases of the phthisis of puberty are reported. It was found that these were typical tertiary cases of pulmonary tuberculosis, in which the lymph-node changes could be regarded as being different stages of disease, in the sense of being secondary and tertiary. Lymph-node disease, which naturally follows the tertiary stage as a fresh development, can be designated as a fourth stage, analogous to that of the second stage tending toward generalization.—*Zur Frage der Pubertätsphthise, W. Pagel, Beitr. z. Klin. d. Tuberk., 1925, lx, 312.*—(*H. J. C.*)

Prevalence of Bovine Tuberculosis.—With one-third of the three million cows in Great Britain tuberculous, 10,000 children dying annually from bovine tuberculosis and as much as 10 per cent of the milk delivered to certain cities being infectious, the situation is one that gives grave concern. There are attractive features in all the schemes advocated for eradication of the disease. Surely, no obviously tuberculous cow should furnish butter, milk, cheese, etc., for human consumption. All such animals should be slaughtered. The responsibility is squarely up to the veterinarian, and when attention is paid to the cow rather than the milk and careful systematic inspection of herds becomes the fashion, infection will soon become unimportant.—*The Prevalence of Tuberculosis and Its Suppression, J. Moore, Veterinary J., April 1925, lxxxi, 194.*—(*H. S. W.*)

Bovine Tuberculosis in United States.—Range cattle are practically free from tuberculosis, but the domestic and dairy cattle in some of the older Eastern states have an incidence of reaction to tuberculin which sometimes reaches 40 per cent. In some regions of the country cattle are tested annually, milk is analyzed and reports are published monthly in such a way as to stimulate a great deal of rivalry and competition among the dairymen. One town, the seat of an agricultural college, has virtually eliminated tuberculosis from the cattle of the neighborhood.—*A Brief Note on Tuberculosis of Animals in U. S. A., A. W. Whitehouse, Veterinary J., April, 1925, lxxxi, 201.*—(*H. S. W.*)

Testing Range Cattle with Tuberculin.—California has enacted legislation making it an offense to sell milk from cattle that give a reaction to tuberculin, unless it has been pasteurized. Numerous obstacles have been overcome in applying the test to range cattle, but it has been found that less than 0.5 per cent of these animals give reactions.—*Tuberculin Testing on the Western Range, S. O'Toole, J. Am. Veterinary M. Ass., November, 1925, lxviii (n. s., xxi), 201.*—(*H. S. W.*)

Bovine Tuberculosis in Canada.—The stock owner may avail himself of any or all of four different Government schemes for the control of tuberculosis in cattle. They are all voluntary and the stock owner agrees to observe the Government regulations. Herds are inspected and tested at intervals without cost to the owner and every effort made to eradicate the infection.—*Bovine Tuberculosis in Canada, Rep. of the Veterinary Director-General, 1924, Veterinary J., April, 1925, lxxxi, 198.*—(*H. S. W.*)

Tuberculin Tests on Imported Cattle in England.—Of the Canadian cattle imported into England, only the smallest fraction is infected. But this very fact renders them more susceptible to infection when they mingle with the English herds. Since these cattle are brought in only for beef, there seems to be no justification for doing a tuberculin test routinely on them.—*Should the Tuberculin Test be Applied to Store Cattle Imported into England? H. L. Torrence, Veterinary J., April, 1925, lxxxi, 196.*—(*H. S. W.*)

Lesions of Teats in Tuberculin-Reacting Cows.—Frequently the veterinarian encounters a cow which reacts to tuberculin but at autopsy reveals no sign of tuberculosis. In a considerable number of such animals an area of disease has been discovered in the teat that does not externally resemble tuberculosis. This area is characterized by one or more hard nodules from 1 to 5 cm. in diameter, situated just beneath the skin, and usually in the proximal half of the teat. It

usually ulcerates, does not involve the milk duct, and histologically is made up of fibrous tissue containing small foci of pus and tuberculous structures. In 45 of 60 instances tubercle bacilli were found in smears, but these were few in number. Morphologically these were small, somewhat thicker and shorter than ordinary bovine bacilli, and frequently appeared in pairs. Sixty-five guinea pigs and numerous other animals were inoculated with material from 36 of these cases, but not one developed unequivocal signs of tuberculosis, even when kept as long as 150 days, although in several there were occasional tubercle-like structures, some of them containing acid-fast bacilli. Cultures, tried in 6 specimens, could not be grown. These lesions probably represent a tuberculous infection that is somewhat modified by location.—*Teat Lesions in Cows Reacting to the Tuberculin Test, H. Marsh, J. Am. Vet. Med. Ass., November, 1925, lxviii (n. s. xxi), 185.*—(*H. S. W.*)

Tuberculosis and Adequate Diet for Cattle.—If attention be paid to the feeding of cattle so that one is assured of feeding sufficient vitamines, there will be much less tuberculosis in herds. Continual milking gradually eliminates vitamines from the cow, and thus reduces her vitality and renders her a poor risk against tuberculosis. Shorter milking periods (four months) and feeding of vitamine foods will eradicate tuberculosis.—*Tuberculosis in Relationship to the Vitamine Content of Animal Diets, M. J. Rowlands, Veterinary J., April, 1925, lxxxi, 192.*—(*H. S. W.*)

Protective Inoculation of Cattle with BCG.—The yearly loss from tuberculous cattle is very great, both at the expense of human health and life and as an economic loss. Tuberculin is not a satisfactory prophylactic agent. Immunity occurs only in those animals that are infected and, while it is out of the question to infect all cattle in order to give them immunity to tuberculosis, the strain *BCG*, which is harmless to cattle, although originally a bovine strain, is a good immunizing agent. The animals react to tuberculin for several months. It is also harmless for human beings.—*Prophylaxis of Bovine Tuberculosis by Vaccination, M. C. Guérin, Veterinary J., April, 1925, lxxxi, 163.*—(*H. S. W.*)

Protective Inoculation of Calves.—It is estimated that one million dairy cows in the British Isles are tuberculous and that 5 per cent of these have tuberculosis of the udder. The problem of eradication of the disease is important. Practically all calves are born free from tuberculosis, but usually during the first six months they become infected from either the stalls or the milk. The calves may be immunized by use of a vaccine made from killed cultures of attenuated tubercle bacilli. Immunity from this procedure lasts for at least as long as two years and is established by subcutaneous injections of the product.—*Protection of Calves against Tuberculosis by Vaccination, N. Raw, Veterinary J., April, 1925, lxxxi, 165.*—(*H. S. W.*)

Suppression of Tuberculous Infection in Cattle.—It is well known that a considerable amount of tuberculosis in childhood comes from the use of milk from tuberculous cows, and also that a great deal of tuberculosis among calves and hogs has this same source. The farmer receives no compensation for the slaughtering of his infected cows and, indeed, no law forces him to slaughter them. It is greatly to be hoped that the government (England) will reënact legislation which formerly provided for careful inspection of herds and dairies, paying the owner a considerable percentage of the value of his cow at the time it was slaughtered, the latter being done at the discretion of the inspector.—*The Suppression of Tuberculous Infection, J. S. Lloyd, Veterinary J., April, 1925, lxxxi, 187.*—(*H. S. W.*)

Future of Tuberculin Testing of Cattle.—On the basis of tuberculin tests and retests and autopsy results, it is estimated that 3 per cent (2,000,000) of the 64,000,000 cattle in the United States are tuberculous. Milk from cows having tuberculosis of the udder practically always contains tubercle bacilli; that from cows with generalized disease frequently has them; and that from cattle with healthy udder and disease too slightly advanced to be clinically recognizable by physical examination sometimes contains them. Mixed milk from tuberculous herds is to be regarded as dangerous. The practice of selling animals known to be tuberculous is prevalent, and is to be condemned as dangerous to the general public. Of the 2,000,000 tuberculous cattle in the country about 300,000, or 15 per cent, have generalized disease, and the financial loss from their maintenance probably reaches $15,000,000 per year to cattle raisers, so long as they are retained. There is a much greater incidence in cattle that live near the larger centres of population because most cattle owners are dairymen only and live near the cities. These owners continually replace unproductive cows with fresh cows, and in this way introduce a good deal of tuberculosis. Upon application

of the tuberculin test to such herds a good number are found to react and are killed, but no cleaning up of premises is done and no consideration given to maintenance of test-free herds, with the consequence that subsequent tests show still a high percentage of reactors. Such results are used as an argument against the efficacy of slaughtering reactors as a means of eradicating the disease. Every care should be taken to clean and disinfect after the slaughter of reactors, additions to the herd should be reaction-free, and testing should be voluntary on the part of the owner. Pasteurization of milk is not the solution of the problem, for, in the first place, small milk producers would find the scheme neither practical nor economically sound and, in the second place, the rural population usually furnishes itself with milk, and pasteurization in these circumstances is out of the question. Federal and local governments are spending more than $15,000,000 annually on antituberculosis work in cattle, and it is thought sound to predict that within the next twenty-eight years, the incidence will be reduced to less than one-half of 1 per cent.—*Present Status and Future Outlook of the Tuberculin Test, S. E. Bruner, J. Am. Vet. Med. Ass., April, 1926, lxix (n.s., xxii), 68.—(H. S. W.)*

Wassermann's Complement-Fixation Test in Cattle.—The Wassermann complement fixation for tuberculosis was found positive not only in cattle with widespread tuberculosis, but frequently also in those in which autopsy disclosed no tuberculosis. Therefore, no diagnostic value can be attributed to the test. The serum of calves reacted in a majority of cases negatively. The serum of cattle likewise reacted positively in most cases to the lecithin flocculation test of Sachs-Klopstock, while the reaction in calves was mostly negative. The flocculation test did not always parallel the Wassermann reaction.—*Über Erfahrungen mit der v. Wassermannschen Tuberkulosereaktion und der Lecithinflockungsprobe bei Rindern und Kälbern, H. Wendt, Centralbl. f. Bakt., Abt. I, Orig., 1925, xliv, 26.—(H. J. C.)*

Bovine Tuberculosis and Milk Supply.—Such a question as this has both public health and economic aspects. About 1,000,000 head of dairy cattle in Great Britain are tuberculous, and this is about one-third of the entire dairy population, but a large percentage of those that are infected have but slight involvement. Measures that provide for elimination of all cows that have tuberculosis of the udder are good as far as they go, but it must be realized that disease of this organ is practically always secondary to disease elsewhere in the body and, further, that bacilli may be eliminated through the milk without the udder itself being the seat of the infection. Ten per cent of the samples of mixed milk contain tubercle bacilli (in Manchester), and this is higher than it was in 1901 in the same district. The contributing causes in bovine tuberculosis are much the same as they are in human tuberculosis. Nothing short of elimination of all reactors to a tuberculin test, repeated every six months, and scrupulous care as to disinfecting premises, and avoiding the introduction of new stock that is tuberculous, will rid a herd of tuberculosis and keep it so. A very small amount of tuberculosis in a herd may very quickly contaminate a large percentage of the herd. Improvement in housing conditions is one of the important matters that has received but scant attention. Systematic and frequently repeated disinfection and quarterly inspection will help lessen the incidence among cattle and therefore the menace to human beings. The keeping of cattle sick with tuberculosis should be an indictable offence.—*The Control of Tuberculosis and the Milk Supply, J. W. Brittlebank, Veterinary J., April, 1925, lxxxi, 171.—(H. S. W.)*

Tuberculosis of Pig.—The pig (swine) has a very high mortality from tuberculosis in many countries of the world. The disease is caused by either human, bovine or avian tubercle bacilli, but by far the most common cause is the bovine bacillus, cattle feces being the greatest source of infection. Fowl and human excreta are sources, as is also tuberculous milk. The disease spreads rapidly through a herd, once it is introduced. Clinical signs and symptoms are fairly characteristic, with emaciation, weakness, digestive troubles, short dry cough, and swelling of the cervical and mesenteric lymph nodes. The tuberculin test is helpful. Isolation and disinfection on the basis of the results of the skin test will wipe out the infection in a herd, but nothing short of these things scrupulously done will acomplish the result.—*Tuberculosis in the Pig, G. Mayall, Veterinary J., April, 1925, lxxxi, 207.—(H. S. W.)*

Tubercle Formation and Skin Reactions in Pigs.—In elaboration of the work of Much on the significance of the skin in immunity to tuberculosis, 6 pigs were tested intracutaneously with dead human bacilli, old tuberculin and partigens after preliminary treatment with partigens, lecithin and cholesterol. In none of the animals was tuberculosis of the internal organs found on

section. The first skin test gave a marked reaction, in all the animals, to dead human tubercle bacilli and partigen N. The second skin test revealed a marked reaction in all the animals to O. T. and partigen N. Histologically, no tubercle formation was found in the animals preliminarily treated with partigens R and N and retested with these substances. Only after higher concentrations were foci of definite tuberculous structure and tubercle-like formation determinable. Preliminary treatment did not seem to be significant as regards the occurrence of these foci. It is probable that the skin inoculation itself caused the changes. Since the animals were healthy but gave tuberculin reactions the specificity of the tuberculin reaction is denied. Immune reactions in the sense of Much are obtained also with substances derived from the tubercle bacillus in animals not previously treated.—*Neue Funde über Tuberkelbildung und Hautreizantworten, gewonnen am Schwein, A. Haim, Beilr. z. klin. d. Tuberk., 1924, lx, 1.*—(*H. J. C.*)

Tuberculosis of Dog.—Tuberculosis occurs in dogs, but is uncommon except among the dogs of France. It manifests itself especially in fall and winter, and is seen more often in city and small house dogs than in larger outdoor dogs. Ingestion of human sputum is likely the more common mode of infection. The dog looks sad, is easily tired, and has cough and often enlarged lymph nodes about the pharynx. His master usually has tuberculosis. The skin test is helpful.—*Tuberculosis in the Dog, G. Mayall, Veterinary J., April, 1925, lxxxi, 209.*—(*H. S. W.*)

Tuberculous Choroiditis in Cat.—In tuberculous cats choroiditis is not uncommon. It frequently precedes other signs of clinical tuberculosis by a considerable time and is usually bilateral. It is the commonest cause of blindness in cats.—*Tubercular choroiditis in the Cat, H. Kirk, Veterinary J., April, 1925, lxxxi, 210.*—(*H. S. W.*)

Spontaneous Tuberculosis in Rabbits.—Rabbits are now extensively raised for wool, and raisers have had recourse to feeding milk to these animals with the result that many of them have died of tuberculosis. Aside from the attention this has directed to the rabbit-raising industry, it is a commentary on the amount of contaminated milk that is being dispensed for human consumption.—*Tuberculosis in the Rabbit and Guinea Pig, H. Gray, Veterinary J., April, 1925, lxxxi, 212.*—(*H. S. W.*)

Mixed Infection in Guinea Pigs.—*Bacterium abortum* produces a disease in guinea pigs, the lesions of which are similar to tuberculosis. In examining the tissues of cattle for the presence of infection with *Bacterium abortum*, it was found necessary to inject extract of lymph nodes into guinea pigs. Although there were no gross lesions of tuberculosis in the tissues which were injected, it was observed that some of the guinea pigs became infected with the disease. The question arose whether guinea pigs suffering from tuberculosis would show the presence of *Bacterium abortum* should the tissues with which the guinea pigs were injected be infected with both microörganisms. The presence of *Bacterium abortum* in guinea pigs is determined as follows: (1) By the occurrence of typical macroscopic lesions, such as suppurating epididymes, enlarged nodular spleen, and pin-point lesions in the liver; (2) by the occurrence of specific agglutinins; and (3) by the isolation of the microörganisms from the tissues. For the experimental work guinea pigs were injected with both the *Bacterium abortum* and tubercle bacilli, some receiving bacterial suspensions and other extracts of infected tissues. The development of specific agglutinins for *Bacterium abortum*, when this mixed infection was present, was studied; also the possibility of recovering the bacterium in pure culture was determined. The results were as follows: Agglutinins specific for *Bacterium abortum* were found to develop in guinea pigs under the conditions of the experiment. *Bacterium abortum* was also recovered in pure cultures from the livers, spleen and epididymes of guinea pigs under these conditions. It grew on 1 per cent glucose-agar which was unsuitable for the development of the tubercle bacillus. The presence of the two infections did not change the gross appearance of the tissues from that observed in guinea pigs suffering from generalized tuberculosis. The mixed infection results in a shorter disease course and is more fatal than tuberculosis alone.—*Mixed Infection in Guinea Pigs with Bacterium Abortum and Mycobacterium Tuberculosis, A. S. Schoenfeld and C. M. Carpenter, J. Infect. Dis., July, 1925, xxxvii, 68.*—(*J. S. W.*)

Low Incidence of Ranke's Primary Complex.—Careful serial sections were made of 150 postmortems, in which the lungs had been hardened prior to examination by the intratracheal injection of formalin. Most of the cases were adults and only 38 (25.3 per cent) were of old or progressive tuberculosis. The Ranke primary complex was found in 14 (9.3 per cent) of the total and in 23.6 per cent of those show-

ing tuberculous changes. These figures are contrasted with those of other authors, who have found as high as 97 per cent. The explanation for this finding was the fact that many of the cases examined were coal-miners with marked anthracosis. In agreement with Puhl, the author found, around the primary foci, connective tissue rich in coal pigment and with small surrounding vessels in the vicinity. The fibrous regional lymph nodes, in which only a little adenoid tissue was found, contained mostly connective tissue, and had hyaline capsule like lime concretions with coal pigment. The primary complex was located in well-ventilated pulmonary areas, being subpleural and regular, and usually round and discrete. Encapsulated reinfection was found mostly in the apices, being usually multiple, in indurated tissue, with pigmented connective-tissue capsules and surrounding hyaline masses. Whether apical pleural foci of hyaline type could be attributed to an old tuberculosis was not definitely determined.—*Beitrag zum Studium des tuberkulösen Primäraffektes und Reinfektes der Lungen bei 150 Sektionsbefunden, P. Heilmann, Beitr. z. Klin. d. Tuberk., 1924, lx, 185.*—(*H. J. C.*)

Primary Complex.—In 123 postmortems between the ages of fifteen and fifty-nine years, there were 102 cases in which the primary complex of the lung was completely calcified, and surrounded by a fine fibrous-tissue capsule of pin-head to bean size. Aside from this there were 3 healed primary complexes in the intestinal tract and 6 in the lung and intestinal tract. Subpleural localizations predominated. Reinfections were usually found in the depth of the pulmonary apical tissues, always without associated involvement of the regional lymph nodes.—*Makroskopische und histologische Untersuchung des primären Komplexes während der Periode der "isolierten phthise," Subin, Ztschr. f. Tuberk., 1925, xlii, 471.*—(*H. J. C.*)

Secondary Tuberculosis.—Secondary tuberculosis is divided into the three groups, *malignant, severe* and *benign*. The first is rare, and is found predominantly in early childhood, and its clinical forms are miliary tuberculosis, caseous pneumonia and malignant polyserositis. Tuberculous sepsis of childhood, the *typhobacillose* of Landouzy, tuberculosis of the peritoneum and intestine, tuberculosis of the larger bones and joints, or other severe complications, are included with the severe forms of secondary tuberculosis, developing with masked as well as definite localization. They occur most frequently from the fourth year to puberty. Among the forms with definite localization are differentiated peribronchial tuberculous ganglionitis, mild polyserositis and the young forms of Hollo. The mild forms of secondary tuberculosis include the ambulant patients. The chronology of its development embraces malnutrition, scrofulosis, habitual hyperpyrexia (Moro), and benign miliary tuberculosis. As clinical forms of allergic toxemia are especially mentioned asthenic conditions, toxemic tuberculous arthritis (Poncet) and various disturbances of the endocrine organs. The spread of secondary tuberculosis is by continuity as well as by the lymph and blood-stream. In the secondary stages the skin reaction to tuberculin is very marked, and the Mantoux reaction in dilutions of 1:5,000 and 1:10,000 is a valuable differential diagnostic method. As concomitant signs of secondary tuberculosis there are found polylymphadenitis, subfebrile temperature, dyspepsia, enlarged thyroid gland, and tuberculosis of the small bones, skin and eyes (such as phlyctenulae, iritis and cyclitis).—*Die Klinik der sekundären Tuberkulose, A. I. Ignatowski and M. v. Lemešič, Beitr. z. Klin. d. Tuberk., 1925, lxi, 467.*—(*H. J. C.*)

Secondary Stage of Tuberculosis in Adult.—While tuberculous disease of the organs in the histological sense exists during the tertiary stage of tuberculosis and restitution is not possible, the secondary stage of tuberculosis, the stage of generalization according to Ranke, is characterized by the presence of an active tuberculous focus in the infected body that exists mostly in the intrathoracic lymph nodes. The focus is not progressive. The symptoms are at times of a general nature, including weakness, easy fatigue, vasomotor disturbances, pyrexia, lability of the nervous system, etc., or the symptoms can reveal themselves in individual organs directly through irritation and inflammation of the mucous membranes, or indirectly by injury of the vegetative nervous system, and by disturbances of the internal secretions. From a differential diagnostic standpoint the following factors come into consideration: A variability between the slight or negative objective and subjective findings; the periodic, mostly without external cause, appearance of subjective symptoms; and a marked hypersensitiveness to tuberculin. So long as the patient still reacts to tuberculin during the secondary stage of tuberculosis the focus is still active, that is, the focus is still open to the blood-stream, with the possibility of relapses of a more or less severe nature. The aim should be to prevent the development of

tertiary tuberculosis.—*Das Sekundärstadium der Tuberkulose beim Erwachsenen: klinisches Bild und Behandlung, E. Schulz, Beitr. z. Klin. d. Tuberk., 1925, lxi, 245.—(H. J. C.)*

Exudative Infiltrations of Primary and Secondary Pulmonary Tuberculosis.—The frequency of the rapidly developing and rapidly disappearing exudates of the primary and secondary-stage types of childhood tuberculosis is considered. They are designated as exudative infiltrations; and as pulmonary infiltrations when the focus is of pulmonary origin, and as hilum infiltration when a bronchial lymph node is involved. Of diagnostic importance are the frequently marked skin reaction, the leucocyte picture in which a shift to the left is significant, and the roentgen examination. In the latter, fluoroscopy with suitable apparatus and technique is preferred to the plate. Since in most cases a hyperemia exists, it is difficult anatomically to determine the infiltration. Etiologically, there is frequently an auto-tuberculinization, and most frequently a superinfection. The greater incidence among girls of school age is due to their greater exposure to house superinfection. A regular roentgenological control of all Pirquet-positive children is important.—*Über die exsudativen Lungeninfiltrierungen der primären und sekundären Tuberkulose, F. Redeker, Beitr. z. klin. d. Tuberk., lix, 1924, 588.—(H. J. C.)*

Cartilaginous Pleural Callosities at Pulmonary Apices.—Careful sectioning of 48 individuals under 20 years of age revealed in only 18 absence of changes over the lung apices examined macroscopically and microscopically, while among the 30 remaining 11 had typical cartilaginous pleural callosities which, with only two exceptions, occurred in the apices, that is, above the first rib. While, in a number of the cases, typical phthisical changes were found in the lungs, in the remainder chronic pneumonic foci were determinable only after exact systematic examination of serial sections, which were proved by exclusion as due to phthisis. The phthisical process causing the callous formation showed various stages of healing and was of a benign character.—*Über die cartilaginösen Pleuraschwielen an der Lungenspitze, F. Focke, Beitr. z. Klin. d. Tuberk., 1924, lix, 228.—(H. J. C.)*

Anthracotic Tuberculous Infiltrations of Apex.—Thirty cases of predominantly circumscribed indurations of the pulmonary apices are described. Five main forms are differentiated. In the first there is a coarse and dense sclerotic tissue, the product of prolonged disease. In the next form there is epithelial desquamation with a retention of the elastic fibres, being designated mostly as a gelatinous infiltration. The picture in the third form is that of caseous pneumonia in its various stages; in the early stages the elastic fibres are still present, but they are absent in the later stages. The fourth form presents more marked changes, resembling those of indurative pneumonia in which the elastic fibres still maintain the configuration of the pulmonary parenchyma. The fifth form includes dense old adhesions of the lung with the costal pleura. All of these forms can, to a certain extent, exist side by side.—*Über anthrachotische tuberkulöse Spitzenschwielen, N. Orlandi, Ztschr. f. Tuberk., 1925, xlii, 461.—(H. J. C.)*

Chronic Localized Tuberculosis.—From a consideration of therapeutic results that are given, the following statements may be put down, if we view cavity formation in the light of the phenomenon of Koch: *1.* It has been shown that tuberculin does not cause a skin reaction in general tuberculosis, where the phenomenon of Koch cannot be induced. *2.* Tuberculin in minute doses can lead to a reduction of skin sensitiveness after prolonged exhibition, and therefore, presumably, to a reduction of the tendency to cavity formation, those patients whose skin sensitiveness first rises and then gradually falls off always showing regressive signs. *3.* Tuberculin in large doses, especially in active cases, leads, as is to be expected if cavity formation is an evidence of the Koch phenomenon, to an increased tendency to cavity formation, or an increased Koch phenomenon. *4.* Dreyer's diaplyte vaccine, which can give no local reaction, and therefore produces no Pirquet reaction, and thus no phenomenon of Koch, cannot have any influence on chronic localized tuberculosis. In a series of cases it has been shown to be without effect either on the physical signs of disease or on the degree of cutisensitiveness to tuberculin.—*Chronic Localized Tuberculosis: an Evidence of the Phenomenon of Koch, W. T. Munro and J. W. Winchester, Tubercle, January, 1926, vii, 161.—(J. C. D.)*

Cause of Preponderance of Right-Sided Apical Pulmonary Tuberculosis.—Of 2,465 cases of first-stage pulmonary tuberculosis, 80.5 per cent were right-sided and 19.5 per cent left-sided. With the progression of the disease right-side involvement diminished in incidence, while the left-sided involvement increased to 40 per cent in the third stage. In other words, the right side is the favored site of localization,

while the left side favors progression of the disease. The explanation of an increased possibility of infection in the right apex because of the wider lumen and more direct course of the right bronchus is not entirely satisfactory. The right hemidiaphragm has less mobility than the left because of its close relation to the liver. The respiratory movements of the apices stand in close relation to the respiration of the rest of the lung. The diminished intensity of the respiratory movement, and with this the less-marked lymphatic circulation in the right apex, play a part in the persistence of tubercle bacilli in these parts of the lung.—*Warum beginnt die chronische Lungenschwindsucht meist in der rechten Lungenspitze? J. Geszti, Beitr. z. Klin. d. Tuberk., 1925, lx, 276.*—(*H. J. C.*)

Specific Changes in Regional Lymph Nodes in Phthisis.—The character of the process in the regional lymph nodes was studied in cases of localized phthisis and was found to correspond in these two regions (the lung and lymph nodes), in so far as this could be determined.—*Zur Frage der spezifischen Veränderungen der regionären Lymphdrüsen in der Periode der isolierten Phthise, Viktoria Schwaitzar, Ztschr. f. Tuberk., 1925, xlii, 475.*—(*H. J. C.*)

Fibrin Clots in Pneumothorax.—Two cases are reported in which the X-ray revealed shadows, about 4 cm. in diameter, which were movable with posture. These are considered to be fibrin clots resulting from the rupture of a blood-vessel.—*Vorkommen von Blut-Fibrinkugeln im Pneumothoraxraum, W. Düll, Beitr. z. Klin. d. Tuberk., 1925, lx, 397.*—(*H. J. C.*)

Healing of Cavity.—The authors report on 12 cases in which cavities healed, thus proving that the cavity can completely heal by means of contraction or fibrosis. It is hinted that the healing of cavity progresses more favorably at high altitudes.—*Kavernendiagnose und Kavernenheilung, K. Turban and H. Staub, Ztschr. f. Tuberk., 1924, xli, 81.*—(*H. J. C.*)

Healing of Cavities in Pulmonary Tuberculosis.—The healing process was studied in 72 cases of various forms of cavity. Histologically, the cavities were divided into the macroscopically progressive cavity, the half-empty cavity, and the apparently emptied cavity. It was concluded that the character of the basic tuberculous process is dependent upon the grade of emptying or healing, but an individual residual focus can tend to break up the connective-tissue capsule, and rupture through into the surrounding tissue. In the material studied not a single completely healed and only one apparently emptied cavity, without other tuberculous foci, was found.—*Über die Vorgänge der Reinigung und Heilung der Kavernen bei der Lungenphthise und deren prognostische Bedeutung, G. Giegler, Beitr. z. Klin. d. Tuberk., 1924, lx, 195.*—(*H. J. C.*)

Emphysema of Skin and Mediastinum in Pulmonary Tuberculosis.—This is a case report of a patient who, during the course of pneumothorax treatment, developed extensive emphysema of the skin and mediastinum from the rupture of a cavity into the structures of the neck.—*Ueber einen Fall von Haut- und Mediastinalemphysem bei Lungentuberkulose, E. Pick, Wien. klin. Wchnschr., May 7, 1925, xxxviii, 508.*—(*H. S. W.*)

Lung Markings of Normal Dogs.—A review of the literature is given. The result of experimental work on dogs may be summarized as follows: After removal of blood from the lungs of normal dogs the roentgenographic markings were changed from the usual broad solid ramifying shadows to fine, delicate, narrow or linear shadows that usually appear in duplicate. After insertion of wires into the bronchi the course of the lumina could be demonstrated by a study of flat plates and stereoroentgenograms, and a comparison made with the linear shadows. Since the wires were in a different plane and since the linear shadows did not enclose the wires except at the hilum and medial part of the lung field, it can be assumed that the bronchial walls do not cast a shadow in the roentgenogram. This was corroborated by the fact that when dry barium sulphate had been blown into the bronchi and their inner surfaces thereby outlined in their proximal extent, no shadow could be demonstrated beyond the shadow of the barium sulphate which would correspond to a continuation of it. After citrated blood had been reinjected into the vessels of a lung from which the blood had been removed, roentgenograms showed the reappearance of the heavy solid ramifying shadows that appear in the usual roentgenogram of the lungs. *Conclusions: 1:* In the lungs of normal dogs the walls of the main bronchi at the hilum only may cast a shadow in a roentgenogram. *2:* The bronchial walls in the outer portions of the pulmonary field do not cause a shadow. *3:* In roentgenograms of the lungs of normal dogs the broad solid ramifying shadows seen radiating out from the hilum are caused in the main by the walls of the vessels and the blood they con-

tain.—*An Experimental Study of the Markings Seen in Roentgenograms of the Lungs of Normal Dogs, M. J. Marquis, Am. J. Roentgenol. and Radium Therapy, September, 1925, xiv, 247.*—(*E. H. K.*)

Cellular Reaction to Tubercle Bacilli.—In an earlier contribution it was shown that only a small portion of tubercle bacilli injected into the peritoneal cavity of white mice and tuberculous guinea pigs suffer bacteriolysis, while 90 to 95 per cent are excreted in the bile and feces as acid-fast forms. In this contribution the cellular reaction was studied. The injection of tubercle bacilli into the peritoneal cavity of nontuberculous mice and guinea pigs resulted in the formation of an exudate in which the histiocytes increased in number, the lymphocytes decreased, and temporarily the polymorphonuclear leucocytes increased. The lymphocytes played a passive rôle, and it is maintained that the reaction in tuberculosis is not lymphocytic but predominantly histiocytic in character. In the mouse the bacilli are almost exclusively phagocyted by the histiocytes, rarely by the polymorphonuclear ceils, and not at all by the lymphocytes. Repeated injections of bacilli into the peritoneal cavity causes a more rapid reaction with more predominant histiocytic reaction. After the introduction of acid-fast saprophytes, pyocyaneus, lecithin, fat, milk, egg-white or sugar into the peritoneal cavity, the mouse and guinea-pig react by an increase of macrophages and polymorphonuclear cells in which the histiocytic reaction stands out most markedly. Qualitatively, the reaction is dependent upon the substance introduced, and quantitatively there are differences present. Specificity is indicated quantitatively.—*Über die Zellreaktion des Organismus bei der Injektion von Tuberkelbacillen, N. L. Jiwago and W. A. Lubarski, Ztschr. f. Tuberk., 1925, xliii, 185.*—(*H. J. C.*)

Anatomic Reactions to Fractions of Tubercle Bacilli.—The author used, in animal experiments, three preparations: (1) *Ektotuberkulin*, the filtrate of culture media of tubercle bacilli, which proved specific in high dilution in tuberculous individuals; (2) *Endotuberkulin A*, the concentrated extract obtained from bacilli killed by heating; and (3) *Endotuberkulin B*, heated tubercle bacilli, from which the soluble parts had been extracted. The last two preparations do not cause reactions in tuberculous guinea pigs. The bacillary bodies can disappear from the site of inoculation without causing tissue changes. If cellular changes occur the bacilli can be found weeks and months after inoculation. They are split up by the tissue juices. If there occurs a dissolution of the tissues, chemical substances are liberated from the bacillary bodies, which react biochemically with the tissues. A few days after inoculation there are found granules and particles, as well as granular rods, which indicate a bacteriolytic action of the tissue juices upon the heated bacilli. The substance liberated from the bacillary bodies by the tissues is called *Endo X*. Endo X is the reagent which causes the tissue changes following inoculation. The effect of Endo X, resulting in pus formation and the disappearance of connective tissue, is designated as the tuberculous primary effect, because of which there ensues the formation of new chemical substances, causing the secondary phenomenon of new cell formation, which then does not occasion cell death but a proliferative tendency. When a tuberculous animal is injected with heated tubercle bacilli, there constantly develops a positive reaction after intracutaneous or subcutaneous injection, which is far more violent than that occurring in a nontuberculous animal. In the skin of the tuberculous animal there take place tissue destruction and tissue proliferative action. The former is evident in pus formation, the latter by inflammatory granulation tissue which arises early in the tuberculous animal. The intracutaneously elicited "Ekto reaction" in a tuberculous guinea pig occasions an acute inflammation with marked erythema, which retrogresses, dries, discharges and subsequently heals. A repetition of the Ekto injection does not differ in effects, from the first reaction. The subcutaneous, and frequently also the intracutaneous, injection of Ekto causes a focal reaction. Histologically, there is initially a purulent inflammation of the tissues and later there occurs new connective-tissue formation with typical giant cells. The intracutaneous injection of Endo A into the tuberculous animal appears clinically similar to that of the intracutaneous injection of Ekto. A general reaction is doubtful, and a focal reaction could not be determined. Histologically, there was pus formation with discharge, which subsequently resulted in typical and atypical giant-cell formation of tuberculous granulation tissue.—*Zur Pathogenese des tuberkulösen Krankheitsherdes, I. A. Jesionek, Ztschr. f. Tuberk., 1924, xli, 225.*—(*H. J. C.*)

Development of Tubercles in Vitro.—The method of tissue culture furnishes the possibility of a thorough histological analysis of the tissues in the living condition as well as after fixation and staining. The fact

that there is no circulation *in vitro* facilitates histogenetic investigations, no hematogenous elements interfering with the clarity of the histological picture. In cultures of rabbit lung tissue inoculated with tubercle bacilli, both tissue cells and bacilli can be kept alive a long time (twenty-one days). The tissue shows, in response to infection with tubercle bacilli, either a productive or an exudative reaction. This reaction is connected exclusively with the cellular elements of the interstitial connective tissue of the parenchyma of the lung. This tissue contains (the hematogenous cells of the circulating blood being ruled out in cultures) two cell types: (1) the endothelium of the capillaries and (2) the elements described as "septal cells," which are identical with the so called "granular" or "vacuolated" nucleated cells of other observers, and are erroneously supposed to belong to the "respiratory epithelium." The former, contrary to the belief that the epithelioid cells of the lung tubercles originate from the capillary endothelium, does not play any rôle whatsoever. The epithelium is of no importance either, as the alveolar wall is not provided with any "respiratory" epithelial layer, except the non-nucleated plates. These so called "granular" epithelial cells, although partly arranged after the fashion of epithelium, in reality are not epithelial elements. They are connective-tissue cells belonging to the so called reticulo-endothelial or histiocytic system, and provided with embryonic potencies of development. These "septal cells," as the author describes them, are the real active elements. Together with the cells which were activated previously (dust cells or alveolar phagocytes), and corresponding to the mobilized histiocytes in other parts of the body, they are mobilized, and furnish the new free phagocytic and ameboid cells, engulfing the bacilli and transforming themselves into large epithelioid cells. These epithelioid cells either accumulate in the alveoli in the form of large exudate cells (exudative reaction), or they become arranged in tubercle-like clusters; in some cases a peculiar diffuse mesencyhme-like transformation of the interstitial tissue takes place. The two latter phenomena may be looked upon as the expression of a productive reaction. Typical giant cells could not be found in these cultures. Nevertheless, it is certain that in tuberculosis of the lungs the same elements must play the leading rôle as in tuberculosis of the lungs *in vitro*. In the body, of course, the hematogenous cells also take an active part in the process. We know that they emigrate in all inflammatory processes and become transformed into polyblasts, and, in tubercle formation, furnish a part of the epithelioid cells. The tubercle bacilli in the tissue cultures were found to influence the elements of the explanted tissue through their soluble products of metabolism. This influence may manifest itself locally as well as diffusely; to this action may be attributed the extensive mesenchyme-like tissue formation, especially in later stages, in which the toxins must be present everywhere in the culture in uniform concentration. In cultures of lymphoid tissue with tubercle bacilli, the fibroblasts and endothelium of the blood vessels assume an embryonic character. In the cultures of the lung the same is true for the septal cells. They must be endowed with unspent embryonic potencies, and represent cells of a primitive, undifferentiated nature. They might be compared with the syncytial cellular reticulum of the lymphoid tissue or with the reticulo-endothelial, histiocytic elements of the body in general. Under the influence of the stimulus originating in the tubercle bacilli, the septal cells which have not been used in the formation of wandering phagocytic elements (histiocytes, epithelioid cells) become transformed into a peculiar tissue resembling embryonic mesenchyme. Under the conditions prevailing *in vitro* they usually do not give rise to fibroblasts. In the body, however, they might play a decisive rôle in the healing of the tuberculous lesions, in the substitution of the fibroblastic for the histiocytic reaction, as a source of the fibroblasts forming the scar-tissue.—*The Reaction of Lung Tissue to Tuberculous Infection in Vitro (with Two Plates), F. J. Lang, J. Infect. Dis., November, 1925, xxxvii, 430.—(J. S. W.)*

Rôle of Monocyte in Tuberculosis.—In the case of tuberculosis, it is quite clear that the human body has a marked power to produce an immunity, but we have as yet no direct control of the production of this immunity. The concept that tuberculosis is a disease which affects primarily a single strain of cells, the monocytes, is presented in this article. It is now known that the epithelioid cell, the characteristic cell of the tubercle, is a modified monocyte. The authors now offer evidence to show that the infection of tuberculosis causes an overproduction of the monocytes, including all of their stages, namely the reticular cell, the typical monocyte and its two derivatives, the epithelioid cell and the giant cell; that the tubercle bacillus so alters the cytoplasmic activity of the monocytes that the cell becomes a suitable medium in which the bacillus can live and multiply, or in other words, that the bacillus of tuberculosis becomes a parasite within the cell; and that the

marked overproduction of monocytes in connective tissue is correlated, in the acute phase of the disease, with an increase of the monocytes in the circulating blood. It has been shown by Sabin, *et al.*, that the mononuclear cells of the connective tissues can be separated into two distinct strains, clasmatocytes (macrophages) and monocytes, on the basis of two lines of evidence, first, their different embryological origin, and second, their morphological and physiological differences. The clasmatocyte is derived from the endothelium and is the same cell as the "endothelial leucocyte" or "endothelial phagocyte" of other authors. On the other hand, the monocyte does not arise from endothelium, but rather from the reticular cell, a primitive embryonic *rest* cell, in common with the other white cells. The analysis of the morphological and physiological differences between clasmatocyte and monocyte has depended on modern methods for studying living cells, specifically on the use of the so called vital and supravital staining. By these methods the clasmatocytes are shown as a type with marked phagocytic powers, characterized by the very large size of the foreign bodies which they engulf, by their marked power of agglutinating such material, and by the fact that the engulfed material (dye, etc.) is distributed in the cytoplasm wholly without pattern. The reaction of the monocytes, on the other hand, to supravital staining brings out a constant and characteristic pattern. In the monocytes there are certain fine bodies that stain with neutral red, which occur in a rosette around the centrosphere, and the presence of the rosette limits the zone for storage of phagocytized material to the periphery of the cell. The tiny bodies comprising the rosette stain a salmon color with neutral red. The larger bodies are true vacuoles of digestion comparable to the vacuoles of the clasmatocytes. The fine particles that go to make up the rosette are not the same as the azurophile granules of fixed films, since the asurophilic granules are scattered without pattern in the cytoplasm. To determine the influence of tuberculosis on the monocyte, a series of rabbits was infected with varying doses of bovine tubercle bacilli, and careful blood counts were made at close intervals, many animals being counted daily for periods of six to seven weeks. All of the differential counts were made with the supravital technique, as developed by Sabin. This consists essentially in obtaining a drop of fresh blood on a coverslip, and immediately inverting it on a slide which contains a faint dry film of the stain used (neutral red, Janus green). The coverslip is then rimmed with vaseline, and the preparation is placed and studied in a warm box, kept at 37°C. In addition, some preparations or scrapings of tissues were studied by this method. Usually the cut-surface of the organ was gently scraped, and the material obtained was mounted as in the blood film. By this method the characteristic motility and the staining reactions of the polymorphonuclears, monocytes and other leucocytes can be watched and studied over considerable periods of time. As a result of the studies on rabbits it was found that the effect of tuberculosis on the whole monocyte system is a profound one, and consists primarily in a marked overproduction of the diffusely scattered reticular cells which are the parent cells of the monocyte. This reticular cell is also the parent form of all of the other white blood cells, so that the effect of the tubercle bacilli on this cell is definitely to force it toward the production of monocytes. The effect of the production of such an increase in reticular cells and their maturation into monocytes must be a chemical one, affecting the cells throughout the surrounding medium, since neither reticular cells nor very young monocytes have been found containing tubercle bacilli. The next stage in tuberculosis is the differentiation of vast numbers of monocytes into epithelioid cells; this certainly takes place in monocytes which have ingested the bacilli, although the phenomenon, in terms of cause and effect, has not been analyzed. Tubercle bacilli are also engulfed by other cells, as the lymphocyte and connective tissue cells, and the Kupffer cells of the liver. But it seems that the monocytes can be sharply distinguished from all other cells by the fact that in the case of the monocytes the major effect is on the monocyte itself rather than on the bacillus, the monocyte having little or no power to destroy tubercle bacilli. The histological appearance of living monocytes, in which bacilli have been seen, leads to the conclusion that the bacilli are alive within the cell; that the numbers which can be seen within an individual monocyte point also to the idea that the bacilli multiply within the cell. It would seem that the tubercle bacilli live as parasites within monocytes and this concept gives us a new key to the study of immunity. The effect of the tubercle bacillus on the monocyte is the accentuation of one of its normal structures and the suppression of another. Under the influence of this infection there is an enormous increase in the number, accompanied by a decrease in the size, of the fine particles that make the rosette. This rosette then becomes the positive characteristic of the epithelioid cell. The peripheral zone of the epithelioid cell

is the area occupied by the bacilli. The cytoplasm of this zone shows the first signs of degeneration in the development of droplets of fat which may ultimately fill the cell completely. The type of the giant cell which comes from the monocyte shows also the characteristics of the parent cell or monocyte, for the giant cell arises by an abortive amitosis when the rosette has become so enormous as to inhibit completely the division of the centrosome. Therefore, the giant cell of the Langhans type, which has the nuclei in the peripheral zone around the centrally placed rosette, is a derivative of a monocyte. The giant cell shows the same type of fatty degeneration as the epithelioid cell. The tubercle bacillus is not the only stimulus through which the monocyte may become an epithelioid cell. Epithelioid cells occur in small numbers in Hodgkin's disease, and Lewis, Willis and Lewis have demonstrated the production of epithelioid cells in cultures of sterile blood. The effect of tuberculosis on the monocyte is so specific as to indicate that the monocyte is a different strain of cell from the clasmatocyte. In the present study it was found that the effects of tuberculosis on the monocytes were so profound as to be seen in the monocytes of the peripheral blood; in animals in which an acute reaction was induced, the monocytes of the peripheral blood became infected. In these monocytes the first reaction of the cell to the disease could be followed to some extent. In following the blood of the infected rabbits, it was noted that the the ratio of monocytes to total lymphocytes has an important bearing in connection with the disease. Whereas the average normal ratio of monocytes to lymphocytes in counted rabbit's blood was 943 to 2,805, in a group of animals in which the reaction to the disease was consistently unfavorable the ratio was 2,129 to 1,694. On the other hand, the ratio for the group of animals favorably reacting to the disease was 854 to 3,047. In other words, the normal ratio of monocytes to lymphocytes is 1 to 297; the unfavorable ratio (group I) is 1 to 0.79, while the favorable ratio (group II) is 1 to 3.56. Thus a marked and continued reversal of the normal ratio, provided that the monocytes are markedly increased in actual numbers, is a consistent indication of a malignant stage in the reaction of the animal to the disease. The reverse condition is likewise true, for when the lymphocytes are markedly and consistently higher than the monocytes, even though the actual numbers of the monocytes are somewhat above normal, arrested tuberculosis is found without exception. The counts corroborated the well known fact that a leucopenia develops in tuberculosis. In the stage of the leucopenia, in some instances, an increase in the percentage of monocytes or lymphocytes, even with an actual decrease in their numbers, was found, showing that the disease effects primarily monocytes and lymphocytes with a final consistent decrease in the granulocytes. The majority of the rabbits used in the experiments did not show the two extremes of a consistently favorable or a consistently unfavorable reaction, but rather exhibited a varying reaction, in which there has been repeated crossing of the lines of the monocytes and lymphocytes in the plotted curves, with intervals in which the lymphocytes were rather steadily above the monocytes, but in which both were decidedly above normal. From this evidence, it is concluded that the law of the ratio of monocytes to lymphocytes in the circulating blood in acute tuberculosis is of fundamental importance. In these studies a more severe type of infection than miliary tuberculosis was found in some of the rabbits, namely, a condition of diffuse, spreading mononucleosis in which infected monocytes increase in enormous numbers in the tissues, with no reaction on the part of the latter to wall them off into tubercles. This type of infection has been correlated with the most marked increase in the percentages and actual numbers of the monocytes of the circulating blood. In one instance the ratio of the monocytes to the lymphocytes was as 52 to 11. The fact must not be overlooked that an increase in lymphocytes has a relation to the healing of tuberculosis. It has been consistently found that lymphocytes surround healing tuberculous lesions, and that the ratio indicating healing tuberculosis is one in which the lymphocytes are above the monocytes and are increased in actual numbers above the normal average limit. It is suggested that a study of the development of immunity to tuberculosis must include an intensive analysis of the lymphocytes. Furthermore, an attempt should be made to find the substances by which the change of the monocytes into the epithelioid cells is brought about. It is believed that there is such a substance and that its discovery is of major importance. It is not yet clear whether the change of the monocyte into the epithelioid cell is initiated by some chemical substance produced by the infection, which affects the cell structurally and permits bacilli to enter and live in it more easily, or whether by the presence of bacilli within the cell, or perhaps by both methods. There is every indication that the monocyte is the cell primarily damaged by the infection, and that it subsequently becomes the host to the invading bacillus. In

brief, tuberculosis is a disease of the monocytes. The discovery of the substance or substances which bring about the increased production and transformation of monocytes, with the idea in mind of producing an antibody for these substances, seems rational and offers a promising programme. An important problem in connection with the study of the blood at the present time is the analysis of the normal stimuli which have to do with the continued maturation of the cells of the blood throughout the life of the animal, because the discovery of any factors involved in this normal mechanism may lead toward the establishing of methods by which the production of activity of a given cell can be controlled. The next step in the study of tuberculosis seems to the authors to involve an intensive method for the control of the rate of production and the modification of the specific activities of monocytes. Since our evidence indicates that the monocytes phagocytize the tubercle bacilli but then fail to destroy them, it seems particularly important to seek for methods of decreasing the phagocytic activity of these cells or else increasing their cytoplasmic activities so that the ingested bacilli will be destroyed instead of being allowed to live and multiply. Studies with extracts from tissue cultures and tissue extracts in which there has been a great overproduction of monocytes and of the effect of various chemical fractions from the bacilli and other extraneous chemical compounds which may be found to affect the monocyte offer feasible approaches. Thus, through a coöperation between the modern chemical studies of the nature of immunity and the modern experimental analysis of the physiology of the cells of the blood and the connective tissues, there has developed a new method of attack on the problem of tuberculosis.—*The Rôle of the Monocyte in Tuberculosis. R. S. Cunningham, F. R. Sabin, S. Sugiyama and J. A. Kindwall, Johns Hopkins Hosp. Bull., October, 1925, xxxvii, 231.—(J. S. W.)*

Development of Epithelioid Cells from Leucocytes.—The study of *in vitro* cultures of various tissues and of blood leucocytes inoculated with tubercle bacilli shows that the epithelioid and giant cells of tuberculous lesion have the same double origin as the polyblasts or mononuclear exudate cells in common or purulent inflammation. They arise partly from local fixed elements, the histiocytes of the respective tissues (resting wandering cells or clasmatocytes, reticular cells, cells of Kupffer, "endothelial" cells of the sinuses in the spleen, etc.) and partly from the migrated (or local, if available) nongranulated (lymphoid) white blood corpuscles, both monocytes. According to the tissue and to the special circumstances of the case, the relative number of epithelioid cells of histiocytes and of lymphoid descent may vary. If there are no leucocytes available the epithelioid cell will be of purely local, histiocytic origin. This is, for instance, the case in cultures of lung tissue inoculated with tubercle bacilli. If, on the contrary, as in cultures of leucocytes, or in the early stages of tuberculosis following the intravenous injection of bacilli (Yersin and Borrel), only leucocytes are available near the bacilli, the primary tubercles will consist only of transformed lymphoid cells, lymphocytes and monocytes. In the blood leucocyte cultures no sharp discrimination between monocytes and lymphocytes could be made regarding their rôle in the formation of the tubercle. The monocytes respond more promptly to the stimulus and, being larger and better prepared for the defense reaction, sooner reach the fully developed epithelioid stage. The lymphocytes are slower, but nevertheless, they follow in the same way, and sooner or later join the monocytes in their transformation into epithelioid cells.—*Rôle of the Nongranular Blood Leucocytes in the Formation of the Tubercle (with One Plate), A. A. Maximow, J. Infect. Dis., November, 1925, xxxvii, 416.—(J. S. W.)*

Formation of Reticulum in Tubercles.—According to our present knowledge the "reticulum" is a form of fibrous tissue consisting of a fibrillar network, the substance forming the network being termed "reticulum." In sections the reticulum is usually distinguished from the fibrin network by the fact that the former takes the Bielschowsky silver impregnation, and the latter does not. In the investigation of the reticulum in the lesions of tuberculosis we are faced by several questions: Does the tubercle reticulum represent a direct transformation of fibrin into reticulum? Is the agency of cells necessary for its production? Is it laid down within these cells or outside of them? Does reticulin become further elaborated into collagen? To attempt an answer to these questions, tubercles were produced in rabbits, and sections from lesions in various stages of development were stained specifically for fibrin, reticulin and collagen. The following conclusions were arrived at: *1:* The histogenesis of the reticulum is not satisfactorily solved by this method of study; cellular derivatives of the endothelium seem to play an important part in forming reticulum, for they are always present in its vicinity, but they do not appear

to produce it by intracellular activity. *2:* It is indicated that newly formed reticulum is a product of preëxisting reticulum, as it is always continuous with it. *3:* Fibrin plays no direct part in the production of reticulin. *4:* Reticulin is apparently converted directly into collagens, but the manner in which this transformation is affected has yet to be explained. *5:* Caseation and reticulin formation are incompatible; after a preliminary proliferation in areas of early caseation, the reticulum is destroyed. *6:* The presence of tubercles in an organ appears to stimulate the growth and to cause a coarsening of the normal, preëxisting reticulum in their immediate vicinity. This might be interpreted as a forerunner of the production of newly formed reticulin fibrils. *7:* More reticulum is produced in those tubercles occurring in or near portions of an organ already rich in that tissue. Conversely, it is scanty in those occurring at some distance from the strome of the organ, *8:* The importance of collapse in the process of scar formation in chronic tuberculosis of the lung is emphasized in sections impregnated with silver.—*Studies on Endothelial Reactions, ix, The Formation of Reticulum in the Lesions of Experimental Tuberculosis in Rabbits, N. C. Foote, Am. J. Path., July, 1925, i, 341.*—(*J. S. W.*)

Serum Calcium in Pulmonary Tuberculosis.—The sera of 65 clinically carefully studied cases of pulmonary tuberculosis were examined according to the directions of de Waard. The calcium values were found reduced, the more so as the disease progressed (productive form 0.1 mgm. per cent; productive exudative form 9.7 mgm. per cent; exudative form 9.1 mgm. per cent). Especially low values were found in cases of combined pulmonary and intestinal tuberculosis. During hemoptysis the serum calcium figures were increased from 0.5 to 1.0 mgm. per cent. In metabolism experiments it was found that lime feeding did not increase the calcium serum figures in pulmonary tuberculosis. It is believed that the vagotonic symptoms of tuberculous patients are attributable to demineralization.—*Über die Beziehungen des Serumkalkspiegels zur Lungentuberkulose, G. Rosenstein and H. Schmidtke, Beitr. z. Klin. d. Tuberk., 1924, lix, 199.*—(*H. J. C.*)

Respiratory Exchange in Experimental Tuberculosis.—It was found that in the tuberculous guinea pig the respiratory exchange did not follow any uniform law. The respiratory coefficient appeared normal during the first period and elevated during the terminal stages of the disease. This finding is offered as an explanation of the conflicting results previously reported.—*Les échanges respiratoires du cobaye au cours de la tuberculose expérimentale, Fontan, Meeting, Reunion Biologique de Bordeaux, February 3 and March 3, 1925, reported in Presse Méd., March 18, 1925, no. 22, 360.*—(*E. H. K.*)

Fats and Lipoids in Foci of Pulmonary Tuberculosis.—This is a histochemical study of the fats and lipoids in pulmonary tuberculosis. The productive lesion is bordered almost exclusively by combined neutral fats and cholesterin esters, the former being far in excess. Exudative foci, according to age and localization, reveal variable findings. Complete caseation shows predominantly cholesterin. The fats of the productive lesion are due to fatty infiltration. The same is true of the cholesterin deposition of the exudative lesion.—*Zur Histochemie der Lungentuberkulose, mit besonderer Berücksichtigung der Fettsubstanzen und Lipoide, W. Pagel and M. Pagel, Virchow's Arch. f. path. Anat., 1925, cclvi, 629.*—(*H. J. C.*)

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